United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Tennessee Agricultural
Experiment Station

Soil Survey of Sequatchie County, Tennessee

How to Use This Soil Survey

General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

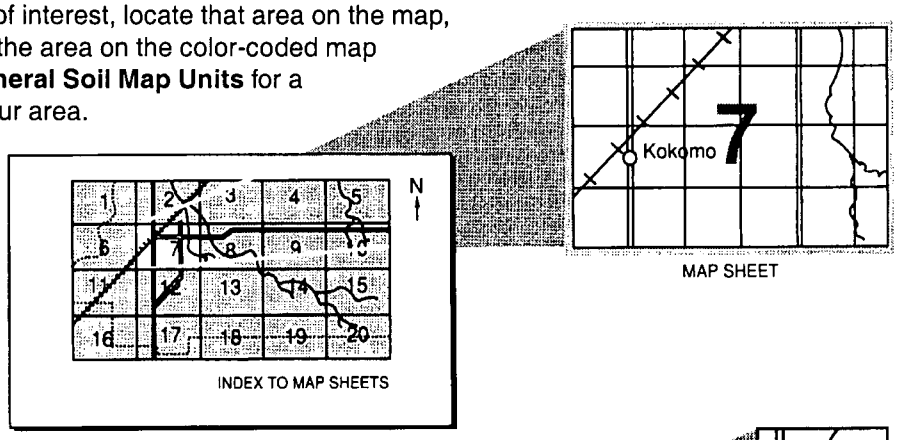
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) leads the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1992. Soil names and descriptions were approved in 1995. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1992. This survey was a cooperative effort of the Natural Resources Conservation Service, the Tennessee Agricultural Experiment Station, the Sequatchie County Board of Commissioners, and the Tennessee Department of Agriculture. It is part of the technical assistance furnished to the Sequatchie County Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Typical landscape in Sequatchie County. Sequatchie loam is dominant in the Sequatchie Valley. Bouldin stony loam is dominant on the Cumberland Plateau Escarpment.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

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Issued 2003

Foreword

This soil survey contains information that affects land use planning in Sequatchie County. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

James W. Ford
State Conservationist
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Soil Survey of Sequatchie County, Tennessee

By Jerry L. Prater, Natural Resources Conservation Service

Fieldwork by Hershel D. Dollar and Jerry L. Prater, Natural Resources Conservation Service, and William P. Goins, Sequatchie County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
Tennessee Agricultural Experiment Station, Tennessee Department of Agriculture, and Sequatchie County Board of Commissioners

SEQUATCHIE COUNTY is in the southeastern part of Tennessee. Dunlap, the county seat, is in the central part of the county (fig. 1). Sequatchie County is in two Major Land Resource Areas. The Cumberland Plateau and Mountains make up 81 percent of the county. The Sequatchie Valley, part of the Southern Appalachian Ridges and Valleys, makes up the rest. Sequatchie County has a total area of nearly 266 square miles, or 170,100 acres.

Sequatchie County consists of about 79 percent woodland, 13 percent pasture, and 3 percent cropland. The rest is in urban, recreational, or other uses.

Livestock and row crops are the main farm enterprises. A diverse industrial base is centered on forestry products and coal mining. The tracts of forest land are under both corporate and private ownership. A few sawmills are in the county.

The soils in Sequatchie County range widely in texture, natural drainage, slope, and depth to bedrock. The soils on the Cumberland Plateau are undulating to steep, well drained, and loamy throughout. They are shallow to very deep over acid sandstone or shale.

The soils on the Cumberland Plateau Escarpment are steep or very steep and contain numerous stones and boulders. The soils in the Sequatchie Valley are nearly level to hilly. They are very deep and well drained to poorly drained. They have a loamy surface layer and a loamy or clayey subsoil.

Most row crops and the majority of hay and pasture are grown in the Sequatchie Valley. In most areas the soils are suited to these uses. In some areas they are too steep, contain too many rock fragments, or have too many rock outcrops.

The soils on most of the Cumberland Plateau and all of the Cumberland Plateau Escarpment are in woodland. The soils vary in their suitability for woodland.

General Nature of the County

This section gives general information about Sequatchie County. It describes history and development, physiography and drainage, and climate.

History And Development

Sequatchie County was approved by act of the General Assembly of Tennessee on December 9, 1857 (Camp 1984). Formed from parts of Bledsoe, Hamilton, and Marion Counties, it was named for the Sequatchie Valley, which in turn was named for the Cherokee Chief Sequachee. Dunlap was chosen the county seat in 1858.

The first inhabitants of Sequatchie County likely were Indians of the Archaic Period. They were followed by Indians of the Woodland and Mississippi Periods. Cherokee, Chickasaw, and Creek Indians used the area as a hunting grounds. In the 1790's, settlers moved into the Sequatchie Valley.

In the 1800's, general farming was practiced mainly in the Sequatchie Valley. The Cumberland Plateau was

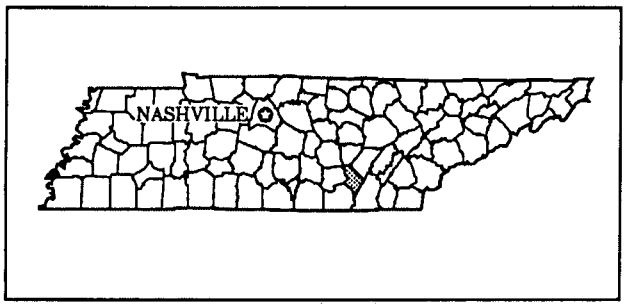

Figure 1.—Location of Sequatchie County in Tennessee

planted in only small acreages of horticultural crops in fenced fields. The plateau was used mostly as open range for livestock until about the 1930's. Horticultural crops are generally increasing, particularly on the Cumberland Plateau.

According to the 1990 Census, the population of Sequatchie County was 8,863. Dunlap, the county seat, had a population of 3,920.

Physiography and Drainage

Sequatchie County ranges from nearly level to very steep. The landscape varies with the geologic formations because of differences in rates of weathering.

The lowest elevation in the county is about 660 feet above mean sea level (m.s.l.) along the Sequatchie River at the Marion County line. The highest points are about 2,380 feet above m.s.l. near Lockhart in the western part of the county and at the top of the Cumberland Plateau Escarpment in the eastern part of the county. On average, the Cumberland Plateau is about 2,000 feet above m.s.l.

The Cumberland Plateau Escarpment divides the Cumberland Plateau from the Sequatchie Valley. The valley is at an elevation of about 1,200 to 1,500 feet below the Cumberland Plateau. It dissects Sequatchie County northeast to southwest.

The Tennessee Valley Divide extends across the northwestern part of Sequatchie County. Dendritic drainage systems flow southward, eastward, and northward. The Cumberland Plateau from Big Brush Creek to Marion County and the Sequatchie Valley are drained southerly to the Tennessee River. The northwestern part of the county, from Highway 111 to Savage Creek, flows towards the Cumberland River. The eastern part of the county, on Waldens Ridge, flows eastward to the Tennessee River. The Sequatchie River is the major stream in the county.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Dayton, Tennessee, in the period 1957 to 1988. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 40 degrees F and the average daily minimum temperature is 28 degrees. The lowest temperature on record, which occurred on January 24, 1963, is -9 degrees. In summer, the average temperature is 75 degrees and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred on July 16, 1980, is 108 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 54.79 inches. Of this, 26 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 22 inches. The heaviest 1-day rainfall during the period of record was 5.94 inches on March 12, 1963. Thunderstorms occur on about 56 days each year, and most occur in summer.

The average seasonal snowfall is about 6 inches. The greatest snow depth at any one time during the period of record was 10 inches. On the average, 3 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 65 percent. The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 8 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another, but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Lily-Lonewood

Undulating to hilly, moderately deep and deep, well drained soils that have a loamy subsoil; formed in residuum derived from sandstone; on uplands

This map unit is on broad undulating to hilly uplands on the Cumberland Plateau. It consists mainly of a smooth plateau weakly dissected by narrow flood plains along intermittent drainageways (fig. 2). Slopes are mostly 2 to 20 percent.

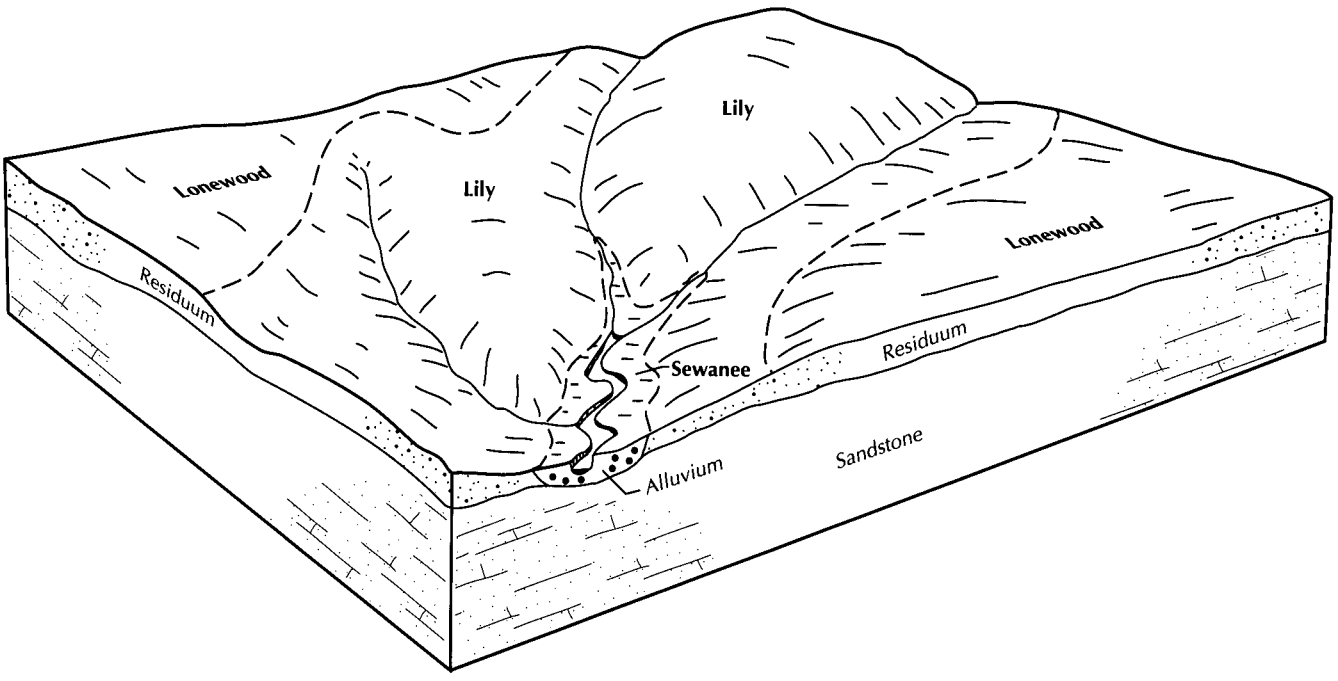

Figure 2.—Typical pattern of soils and the underlying bedrock in the Lily-Lonewood general soil map unit.

This map unit makes up about 14 percent of the county. It is about 42 percent Lily soils and 34 percent Lonewood soils. The rest is soils of minor extent.

Lily and Lonewood soils are undulating to hilly. They are predominantly on broad uplands. Lily soils are well drained and have a brownish loamy surface layer and subsoil. They are 20 to 40 inches deep to hard, acid sandstone. Lonewood soils are well drained and have a brownish loamy surface layer and subsoil. They are 40 to more than 60 inches deep to acid sandstone.

Of minor extent in this map unit are Bethesda, Beersheba, Gilpin, Ramsey, Sewanee, and Bonair soils. The very deep Bethesda soils, the moderately deep Beersheba and Gilpin soils, and the shallow Ramsey soils are on uplands. The moderately well drained Sewanee soils and the poorly drained Bonair soils are on flood plains.

In most areas the soils in this map unit are in woodland. In some areas they are used mainly for pasture, horticultural crops, and row crops. There are no significant limitations to woodland use or management. Productivity is moderate or moderately high on these soils for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. These soils are well suited to moderately suited to most horticultural crops and row crops. They are well suited to pasture. Erosion is a hazard if row crops are grown. In most areas these soils are moderately suited or poorly suited to urban use. Depth to bedrock is a severe limitation for most urban uses.

2. Bouldin

Steep or very steep, very deep, well drained soils that are loamy throughout and that contain a large amount rock fragments; formed in colluvium derived from sandstone; on uplands

This map unit is on long slopes of the Cumberland Plateau Escarpment (fig. 3). The escarpment leads mainly from the Sequatchie Valley to the Cumberland Plateau. It rises in elevation from 1,200 to 1,500 feet. An area in the northwestern part of the county extends to the Highland Rim. An area in the southeastern part of the county extends to the Tennessee River Gorge. Generally, a nearly vertical sandstone cliff is at the uppermost part of the map unit. Slopes range from 20 to 75 percent.

This map unit makes up about 12 percent of the county. It is about 79 percent Bouldin soils and 21 percent soils of minor extent.

Bouldin soils are mainly in the upper part of the map unit. They also extend to the bottom of the unit in the deep gorges. They have a brownish, loamy surface layer and a brownish and reddish, loamy subsoil. They have a high content of stones and boulders of sandstone on the surface and throughout the soil.

Of minor extent in this map unit are Allen, Bodine, Carbo, Cobstone, Enders, Gilpin, Nella, Pailo, and Ramsey soils. Allen and Nella soils are on foot slopes. Enders soils are on nose slopes in the lower part of this map unit. Bodine and Pailo soils are on ridges at the base of the escarpment on the east side of the Sequatchie Valley. Carbo soils are on hill slopes and nose slopes in the middle and lower parts of this unit. Cobstone soils are on fans and terraces in the lowest part of the unit. Gilpin and Ramsey soils are on the uppermost part of this unit above the sandstone cliff.

The soils in this map unit are in woodland. Steepness of slope and stoniness are significant limitations for woodland use and management. The best quality timber in the county is in coves in this unit. On Bouldin soils productivity is moderately high for upland oaks and yellow-poplar. These soils are poorly suited to pasture and unsuited to row crops and urban use. Slope, boulders, and slippage are significant limitations for most uses.

3. Lily-Gilpin-Jefferson

Undulating to very steep, moderately deep and very deep, well drained soils that have a loamy subsoil; formed in residuum derived from sandstone or shale and in colluvium; on uplands

This map unit consists mainly of small, undulating and rolling plateaus and hilly to very steep, long hillslopes. The hillslopes rise 200 to 300 feet in elevation above the adjacent landscape. This unit is deeply dissected. It is on the Cumberland Plateau (fig. 4). Slopes range from 2 to 60 percent.

This map unit makes up about 42 percent of the county. It is about 36 percent Lily soils, 29 percent Gilpin soils, 12 percent Jefferson soils, and 23 percent soils of minor extent.

Lily soils are mainly on the upper part of the map unit on plateaus. They have a brownish loamy surface layer and subsoil and are 20 to 40 inches deep over sandstone bedrock. Gilpin soils are mainly on convex nose slopes and side slopes. They have a brownish loamy surface layer and subsoil. They are 20 to 40 inches deep over shale bedrock. Jefferson soils are mainly on concave side slopes and head slopes. They are very deep and have a brownish loamy surface layer and subsoil.

Of minor extent in this map unit are Lonewood and Ramsey soils. Lonewood soils are deep and are on the smoothest ridges. Ramsey soils are shallow and are on steep shoulders and back slopes.

In most areas the soils in this map unit are in

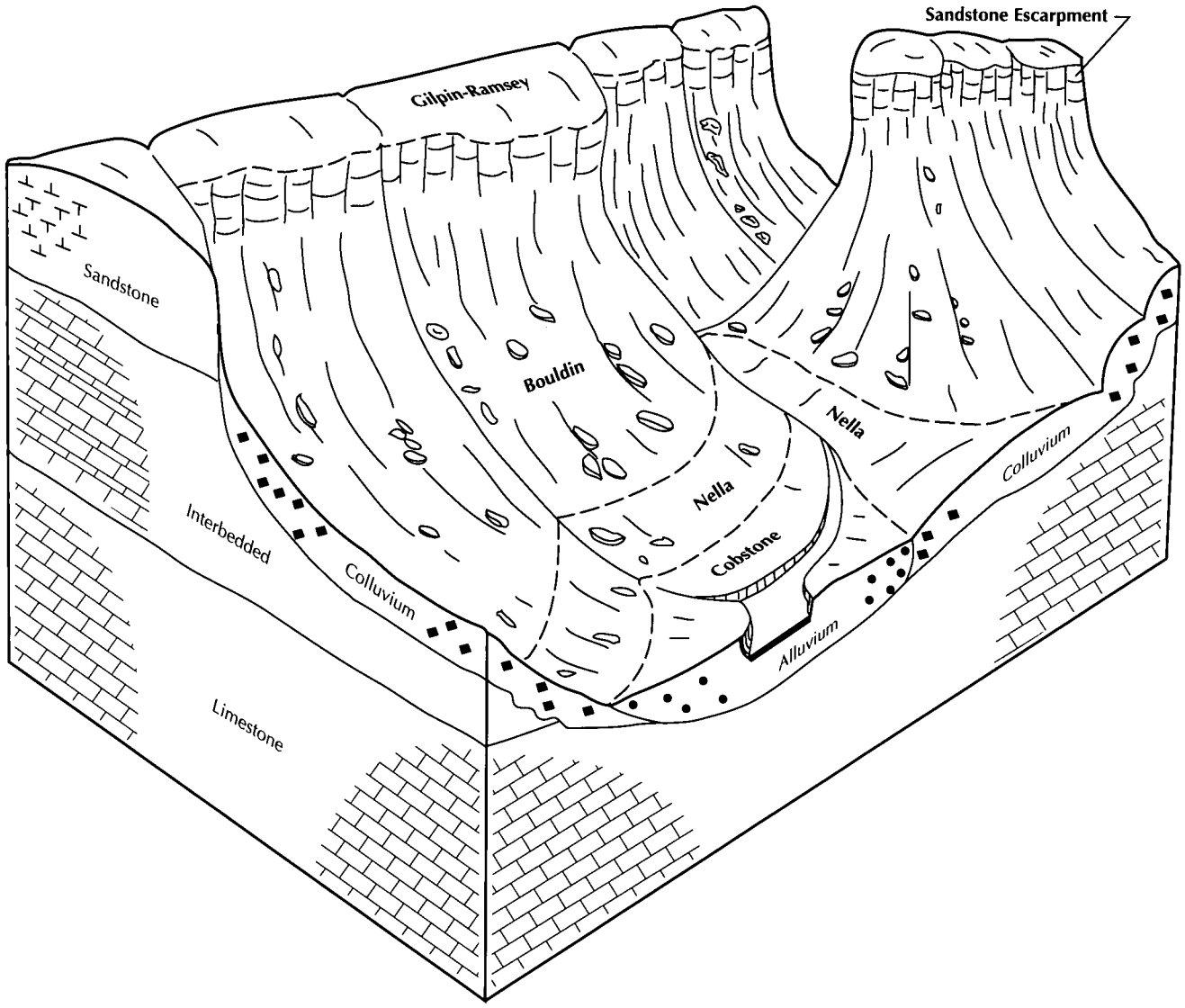

Figure 3.—Typical pattern of soils and the underlying bedrock in the Bouldin general soil map unit.

woodland. The rest is used mainly for pasture and horticultural crops. On slopes of more than 15 percent, steepness of slope and depth to bedrock are the main limitations to woodland use and management. Productivity on these soils is moderate or moderately high for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. On Jefferson soils productivity is high for yellow-poplar. In most areas these soils are moderately suited or poorly suited to row crops and pasture because of slope and depth to bedrock. They are poorly suited to most urban uses, also because of slope and depth to bedrock.

4. Ramsey-Lily

Undulating to steep, shallow and moderately deep, somewhat excessively drained and well drained soils that have a loamy subsoil; formed in residuum derived from sandstone; on uplands

This map unit is highly dissected. It is on rolling ridges and short, steep side slopes that are shallow to sandstone. Sandstone crops out on ridges and along steep drainageways where they converge into deep gorges on the Cumberland Plateau. Slopes are 2 to 50 percent.

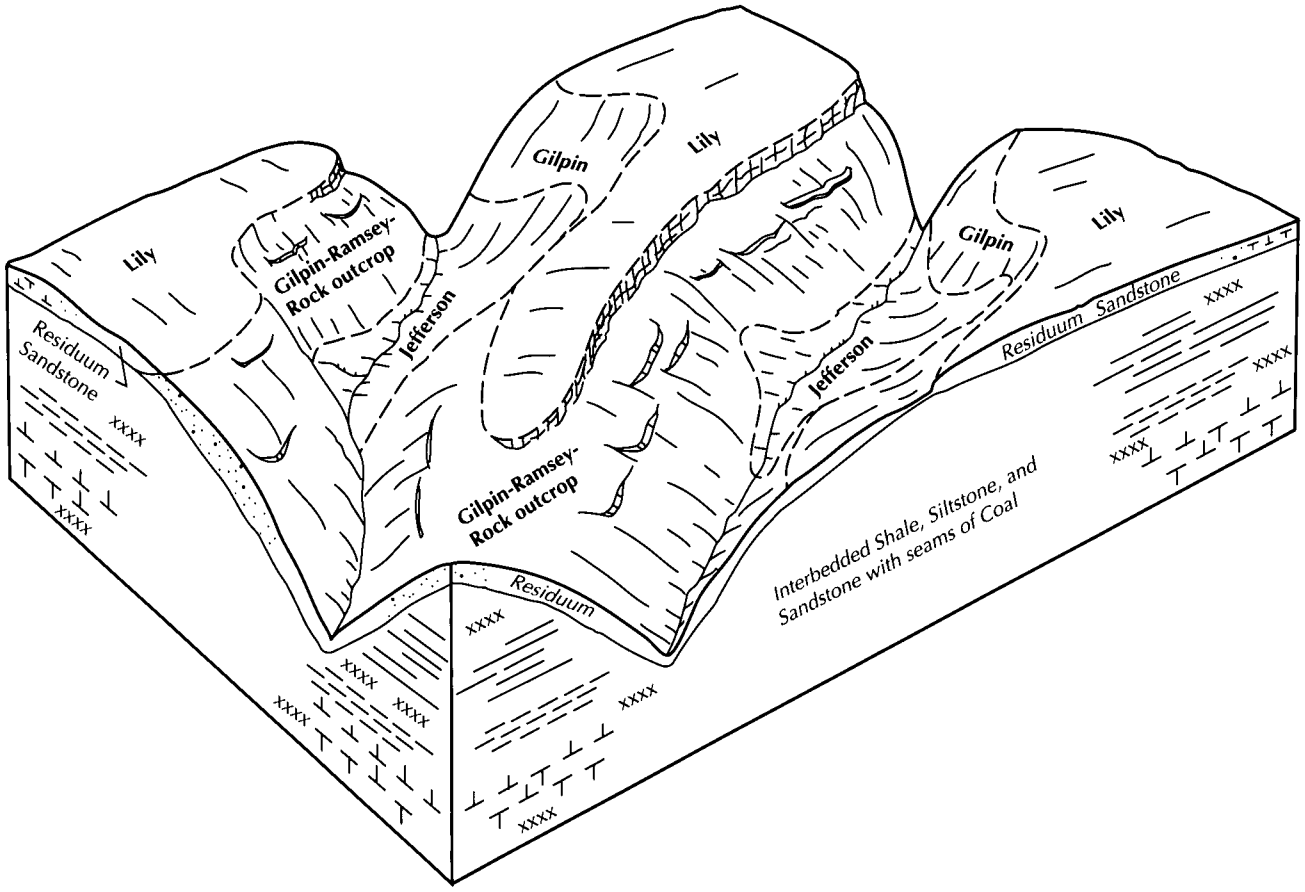

Figure 4.—Typical pattern of soils and the underlying bedrock in the Lily-Gilpin-Jefferson general soil map unit.

This map unit makes up about 15 percent of the county. It is about 42 percent Ramsey soils, 41 percent Lily soils, and 17 percent soils of minor extent.

Ramsey soils are rolling to steep. They are on ridges and side slopes on uplands. They are somewhat excessively drained and have a brownish loamy surface layer and subsoil. They are less than 20 inches deep to acid sandstone. Lily soils are undulating to hilly. They are on ridges and side slopes on uplands. They are well drained and have a brownish loamy surface layer and subsoil. They are 20 to 40 inches deep to hard, acid sandstone.

Of minor extent in this map unit are Beersheba and Lonewood soils on ridges on uplands in the upper part of the map unit. Beersheba soils are moderately deep and Lonewood soils are deep.

In most areas the soils in this map unit are in woodland. In some areas they are used for pasture and horticultural crops. In most areas steepness of slope, rockiness, and depth to bedrock are significant limitations for woodland use and management. Productivity is moderate for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. Except for Ramsey soils on the steeper slopes these soils are generally moderately suited to pasture. These soils are moderately suited or poorly suited to row crops and poorly suited to most urban uses. Depth to bedrock and slope are the main limitations.

5. Waynesboro-Holston-Sequatchie

Undulating to steep, very deep, well drained soils that have a clayey and loamy subsoil; formed in alluvium; on uplands and low stream terraces

This map unit is on long, broad, undulating to steep toe slopes of the Cumberland Plateau Escarpment and on high, intermediate, and low stream terraces (fig. 5). It is in the Sequatchie Valley. Slopes are mainly 2 to 30 percent.

This map unit makes up about 6 percent of the

county. It is about 39 percent Waynesboro soils, 26 percent Holston and similar soils, 10 percent Sequatchie soils, and 25 percent soils of minor extent.

Waynesboro soils are on undulating to steep, old, high and intermediate stream terraces. They have a brownish, loamy surface layer and a reddish, clayey subsoil. The undulating and rolling Holston soils and the similar Allen and Etowah soils are on intermediate stream terraces and toe slopes. They have a brownish, loamy surface layer and a brownish or reddish, loamy subsoil. Sequatchie soils are nearly level and gently sloping. They are on low stream terraces. They have a brownish, loamy surface layer and subsoil.

Of minor extent in this map unit are Colbert, Braxton, Talbott, Capshaw, Swafford, Sullivan, and Hamblen soils. The moderately well drained Colbert soils and the well drained Braxton and Talbott soils are on uplands. The moderately well drained Capshaw and Swafford soils are on terraces. The well drained Sullivan soils and the moderately well drained Hamblen soils are on flood plains.

The soils in this map unit are used for row crops and pasture. Except for a few steeper areas they are well suited to pasture and well suited or moderately suited to most row crops. They do not have any significant limitations to woodland use or management. Productivity is moderately high for yellow-poplar, upland oaks, and loblolly pine. These soils are well suited or moderately suited to many urban uses.

6. Sequatchie-Cobstone

Nearly level and gently sloping, very deep, well drained soils that have a loamy subsoil; formed in alluvium; on low stream terraces and alluvial fans

This map unit is on low stream terraces and alluvial fans in the Sequatchie Valley. It extends into coves fingering into the Cumberland Plateau. The coves begin in narrow mountain gorges and gradually widen

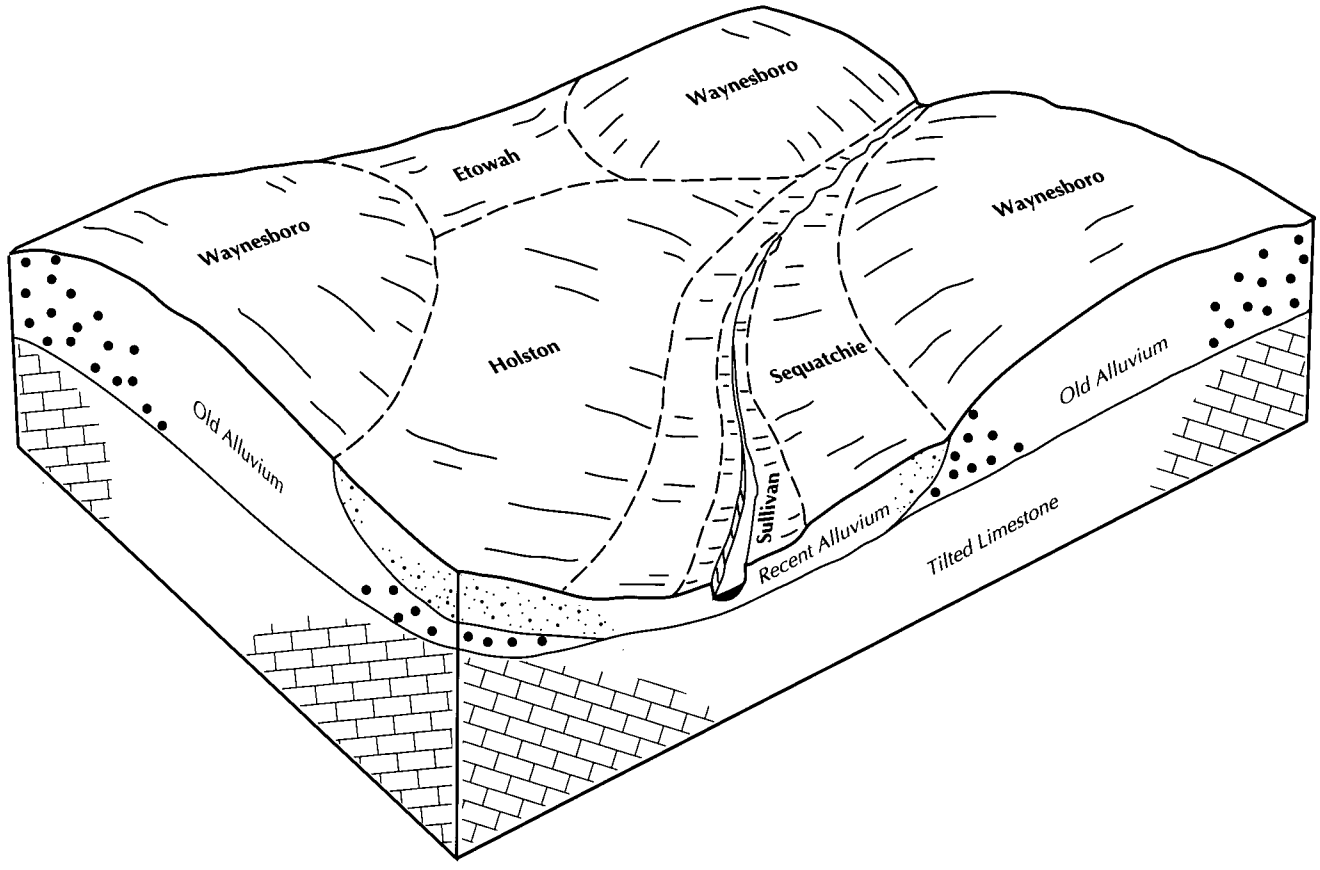

Figure 5.—Typical pattern of soils and the underlying bedrock in the Waynesboro-Holston-Sequatchie general soil map unit.

as they emerge into the Sequatchie Valley. Slopes are mainly 0 to 6 percent.

This map unit makes up about 4 percent of the county. It is about 54 percent Sequatchie soils, 18 percent Cobstone soils, and 28 percent soils of minor extent.

Sequatchie soils are on low stream terraces. They have a brownish, loamy surface layer and subsoil. Cobstone soils are on alluvial fans and low stream terraces at the head of coves and adjacent to drainageways. They have a brownish, loamy surface layer and a subsoil that is high in content of sandstone cobbles and stones.

Of minor extent in this map unit are Allen, Etowah, Waynesboro, Whitwell, and Sullivan soils. Allen, Etowah, and Waynesboro soils are on foot slopes and on high and intermediate terraces. Whitwell soils are on low stream terraces and Sullivan soils are on flood plains.

In most areas the soils in this map unit are used for pasture, hay, horticultural crops, or row crops. A few areas, predominantly of Cobstone soils, are in woodland. In most areas the soils in this map unit are well suited to pasture, hay, row crops, and horticultural crops. Cobstone soils are high in content of cobbles and stones on the surface and within the soil profile. Thus, they are only moderately suited to pasture and are not suited to hay, row crops, and horticultural crops. They generally have no significant limitations to woodland use and management. However, Cobstone soils have numerous stones on the surface. Productivity is high for yellow-poplar, upland oaks, and loblolly pine. Flooding is the main limitation of these soils for many urban uses.

7. Bodine-Pailo-Minvale

Rolling to steep, very deep, somewhat excessively drained and well drained soils that have a loamy and clayey subsoil; formed in residuum and colluvium derived from limestone; on uplands

This map unit is on rolling to steep ridges that runs southwest-northeast through the Sequatchie Valley. Slopes range from 6 to 50 percent.

This map unit makes up about 4 percent of the county. It is about 43 percent Bodine soils, 24 percent Pailo soils, 15 percent Minvale soils, and 18 percent soils of minor extent.

The hilly to steep Bodine and Pailo soils are mainly on side slopes and nose slopes of ridges. The sloping to hilly Minvale soils are on foot slopes. Bodine soils are somewhat excessively drained and have a brownish, loamy surface layer and subsoil. They are high in content of chert throughout the surface layer and the subsoil. In the surface layer and in the upper part of the subsoil Pailo soils are brownish and loamy and have a high chert content. In the lower part of the subsoil they are reddish and clayey. Minvale soils are well drained. They have a brownish, loamy surface layer and a brownish and reddish, loamy subsoil.

Of minor extent in this map unit are Barger, Fullerton, and Tasso soils. The moderately well drained Barger soils are on ridgetops. The well drained Fullerton soils are on side slopes. The moderately well drained Tasso soils are on foot slopes.

In most areas the soils in this map unit are in woodland. In some areas they are used for pasture. They are poorly suited to most urban uses. Except for Minvale soils on foot slopes they are poorly suited to row crops and pasture. Slope of more than 15 percent is a limitation to woodland use and management. Except on Minevale soils, productivity is moderate or low for upland oaks, shortleaf pine, and Virginia pine because of low available water capacity and low fertility. On Minvale soils, productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and loblolly pine.

8. Sullivan-Whitwell-Hamblen

Nearly level, very deep, well drained and moderately well drained soils that are loamy throughout; formed in alluvium; on flood plains and low stream terraces

This map unit is on flood plains and low stream terraces along the Sequatchie River and its tributaries. Slopes are 0 to 2 percent.

This unit makes up about 3 percent of the county. It is about 34 percent Sullivan soils, 20 percent Whitwell soils, 12 percent Hamblen soils, and 34 percent soils of minor extent. Sullivan soils are on flood plains adjacent to drainageways. They are well drained. Whitwell soils are on low steam terraces above Sullivan soils and are moderately well drained. Hamblen soils are on flood plains and are moderately well drained.

Of minor extent in this map unit are Newark, Melvin, Sequatchie, and Swafford soils. The somewhat poorly drained Newark soils and the poorly drained Melvin soils are on flood plains. The well drained Sequatchie soils and the moderately well drained Swafford soils are on low terraces.

In most areas these soils are used for pasture, hay, or row crops. They are well suited to most row crops and pasture. Flooding and wetness are limitations for some crops. These soils have no significant limitations to woodland use or management. Productivity is high or moderately high for yellow-poplar. Flooding is a severe limitation for most urban uses.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Waynesboro loam, 2 to 6 percent slopes, is a phase of the Waynesboro series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Bodine and Pailo gravelly loams, 20 to 50 percent slopes, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Tables" in "Contents") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas

Soil Descriptions

AeC—Allen loam, 5 to 12 percent slopes

This is a very deep, well drained, moderately sloping soil. It is on short, concave foot slopes at the base of the Cumberland Plateau Escarpment. The mapped areas are elongated in shape and range from 5 to 30 acres in size.

Typical Profile

Surface layer:
0 to 8 inches, brown loam

Subsoil:
8 to 21 inches, yellowish brown and strong brown loam
21 to 62 inches, yellowish red and red clay loam

Included with this soil in mapping are small areas of Holston, Nella, Sequatchie, and Waynesboro soils. Holston and Sequatchie soils are well drained. They are mainly in the lower part of this unit. Nella and Waynesboro soils are mainly in steeper areas at the edge of this map unit.

Allen Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for pasture or is in woodland. The rest is used for row crops.

This soil is moderately suited to most row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland. Productivity is moderately high on this soil for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited to many urban uses. Steepness of slope, low strength, and clay content of the subsoil are limitations for some uses. Good engineering design and construction practices will overcome most limitations. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling. Adding coarse gravel to the road base will improve low strength for local roads and streets.

The capability subclass is IIIe.

AeD—Allen loam, 12 to 20 percent slopes

This is a very deep, well drained, hilly soil. It is on foot slopes of the Cumberland Plateau Escarpment. The mapped areas are elongated in shape and range from 10 to 50 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, very dark grayish brown and yellowish brown loam

Subsoil:
5 to 16 inches, strong brown loam
16 to 65 inches, yellowish red and red clay loam

Included with this soil in mapping are small areas of Bouldin, Etowah, Nella, and Waynesboro soils. Bouldin soils are mainly along drainageways. Etowah soils are on toe slopes in the lower part of the map unit. Nella and Waynesboro soils are in randomly scattered areas in the map unit.

Allen Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture.

This soil is poorly suited to most row crops. Erosion is a hazard if row crops are grown. Conservation tillage practices that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff.

This soil is moderately suited to pasture and hay. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland. Productivity is moderately high for yellow-poplar, shortleaf pine, loblolly pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Erosion is a moderate hazard during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is moderately suited or poorly suited to most urban uses. Steepness of slope is a limitation for most urban uses. Low strength and the clay content of the subsoil are limitations for some uses. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling. Adding coarse gravel to the road base overcomes the low strength for local roads and streets.

The capability subclass is IVe.

AeE—Allen loam, 20 to 30 percent slopes

This is a very deep, well drained, steep soil. It is on foot slopes of the Cumberland Plateau Escarpment. The mapped areas are elongated in shape and range from 10 to 50 acres in size.

Typical Profile

Surface layer:
0 to 3 inches, dark brown loam

Subsoil:
3 to 15 inches, strong brown loam
15 to 26 inches, yellowish red loam
26 to 72 inches, yellowish red and red clay loam

Included with this soil in mapping are small areas of Bouldin, Enders, and Nella soils. Bouldin soils are mainly along drainageways. Enders soils are on nose slopes in the middle part of the map unit. Nella soils are in randomly scattered areas in the map unit.

Allen Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In nearly all areas this soil is in woodland. The rest is used for pasture.

This soil is not suited to row crops. Erosion is a hazard if row crops are grown. This soil is moderately suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion. Slope limits the use of equipment.

This soil is moderately suited to woodland use. Productivity is moderately high for yellow-poplar, shortleaf pine, loblolly pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Erosion is a moderate hazard during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer. Cable yarding harvesting systems are safer, reduce damage to the soil, and help to maintain productivity.

This soil is poorly suited to most urban uses. Steepness of slope is a severe limitation for most uses. Low strength and clay content of the subsoil are also limitations for some urban uses. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling.

The capability subclass is VIe.

BaC—Barger silt loam, 6 to 12 percent slopes

This is a very deep, moderately well drained, sloping soil. It has a compact, slowly permeable layer in the subsoil. It is on convex ridgetops of highly

dissected uplands in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 25 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, dark grayish brown and brown silt loam

Subsoil:
5 to 19 inches, light yellowish brown and yellowish brown loam
19 to 23 inches, brownish yellow and very pale brown very gravelly loam that is a very firm and brittle fragipan
23 to 63 inches, light yellowish brown extremely gravelly loam and brownish yellow very gravelly loam that is an extremely firm and brittle fragipan and that has mottles in shades of gray

Included with this soil in mapping are small areas of Bodine, Fullerton, Pailo, and Tasso soils. Bodine, Fullerton, and Pailo soils are mainly on the upper part of or near the edge of this map unit. Tasso soils are mainly on the lower part of this map unit.

Barger Soil Properties and Features

Permeability: Slow within the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: Perched; 1.5 to 2.5 feet; December-March
Flooding: None

In most areas, this soil is in woodland; most of the surrounding area is woodland. The rest is used mostly for pasture.

This soil is moderately suited to most row crops. Steepness of slope, erosion hazard, and moderate available water capacity are the main limitations. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay. Drought-resistant grasses and legumes are best suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for southern red oak, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Site preparation, such as harrowing and herbicide application, helps to reduce immediate plant competition and to increase early seedling growth. Windthrow is a hazard where the root zone is restricted.

This soil is moderately suited or poorly suited to most urban uses. It is poorly suited to septic tank absorption fields because of slow permeability and a perched high water table. A system with a special design is needed to overcome these limitations. Slope is a moderate limitation for several urban uses. Proper design of structures and facilities generally can overcome slope.

The capability subclass is IIIe.

BbB—Beersheba loam, 2 to 6 percent slopes

This is a moderately deep, well drained, and gently sloping soil. It is on broad, convex uplands on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 150 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown and brown loam

Subsoil:
4 to 20 inches, yellowish brown loam
20 to 33 inches, yellowish brown clay loam

Substratum:
33 to 45 inches, soft, weathered sandstone

Included with this soil in mapping are small areas of Lily, Lonewood, and Ramsey soils. Lily soils are in randomly scattered areas in the map unit. Lonewood soils are mainly on broad, smooth areas in the upper part of the map unit. Ramsey soils are in the more sloping areas mainly near the edge of the map unit.

Beersheba Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture and row crops.

This soil is well suited to row crops. But, it is in isolated areas on the Cumberland Plateau or is surrounded by soils that are steeper or thinner over bedrock. Most of the acreage is woodland. Erosion hazard and moderate available water capacity are the main limitations for row crops. Conservation tillage

systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Many grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is moderately suited or poorly suited to most urban uses. Depth to bedrock and seepage are the main limitations. Septic tank absorption fields and sanitary landfills are poorly suited because of depth to bedrock and seepage.

The capability subclass is IIe.

BbC—Beersheba loam, 6 to 12 percent slopes

This is a moderately deep, well drained, rolling soil. It is on upland ridges and side slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown and light yellowish brown loam

Subsoil:
4 to 27 inches, yellowish brown loam
27 to 31 inches, yellowish brown clay loam

Substratum:
31 to 42 inches, soft weathered sandstone

Included with this soil in mapping are small areas of Lily, Lonewood, Ramsey, and Sewanee soils. Lily soils are in randomly scattered areas in the map unit. Lonewood soils are mainly on ridges in the higher part of the landscape. Ramsey soils are mainly on short, steep slopes near drainageways. Sewanee soils are on narrow flood plains along drainageways.

Beersheba Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture and row crops.

This soil is moderately suited to row crops. But, it is in isolated areas on the Cumberland Plateau or is surrounded by soils that are steeper or that are thinner over bedrock. Most of the acreage is woodland. Steepness of slope, erosion hazard, and the moderate available water capacity are the main limitations for row crops. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Many grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is moderately suited or poorly suited to most urban uses because of depth to bedrock, slope, and seepage. It is poorly suited to septic tank absorption fields and sanitary landfills because of the depth to bedrock and seepage. Good engineering design can generally overcome slope.

The capability subclass is IIIe.

BeD—Bethesda channery loam, 8 to 25 percent slopes

This is a very deep, well drained, moderately sloping and steep soil. It is in areas that have been surface mined for coal on the Cumberland Plateau. These areas have been smoothed and vegetated. Some places have an almost vertical highwall. The mapped areas are elongated in shape and range from 5 to 200 acres in size.

Typical Profile

Surface layer:
0 to 10 inches, dark yellowish brown channery loam

Substratum:
10 to 65 inches, dark brown extremely channery clay loam

Included with this soil in mapping are small areas of

Beersheba, Gilpin, Lily, and Ramsey soils. These soils are in randomly scattered, undisturbed areas in the map unit.

Bethesda Soil Properties and Features

Permeability: Moderately slow
Available water capacity: Very low or low
Soil reaction: Extremely acid or very strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland or used for wildlife habitat. It is not used for pasture, cropland, or urban land.

This soil is poorly suited to pasture, woodland, and most urban uses. It is not suited to row crops. Plants that tolerate droughtiness and high acidity are the best suited. Steepness of slope, droughtiness, high acidity, unstable fill, and content of fragments are severe limitations for many uses.

The capability subclass is VIs.

BhF—Bethesda-Pits complex, 20 to 90 percent slopes

This map unit consists mostly of areas of active or inactive surface coal mines on the Cumberland Plateau. In places it consists of a highwall, a pit, and a spoil pile of soil and rock extending around hill slopes more or less on the contour. In other places it consists of spoil piles and pits parallel to each other. The Bethesda soil is very deep, well drained, steep and very steep. It makes up narrow ridges in areas that have been disturbed by surface mining. The ridges are several hundred feet long and vary in height. The Bethesda soil makes up about 55 to 85 percent of this map unit. Pits range from 25 to 200 feet in width and several hundred feet in length. Highwalls range from 25 to 75 feet in height and generally extend the length of the pit. Pits make up about 10 to 45 percent of this map unit. Individual areas range from 5 to 500 acres in size.

Typical Profile

Surface layer:
0 to 2 inches, dark brown very channery loam

Substratum:
2 to 30 inches, yellowish brown extremely channery silty clay loam
30 to 70 inches, light yellowish brown extremely channery clay loam

Included with this soil in mapping are small areas of Beersheba, Gilpin, Lily, and Ramsey soils. They are in undisturbed areas randomly within the map unit.

Bethesda Soil Properties and Features

Permeability: Moderately slow
Available water capacity: Very low or low
Soil reaction: Extremely acid or very strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

This soil is idle. It has either no vegetation or sparse weeds, pines, and black locust.

This soil is poorly suited to woodland use and to most urban uses. It is not suited to pasture and row crops. Plants that tolerate droughtiness and high acidity are best suited. Steepness of slope, droughtiness, acidity, unstable fill, and content of fragments are limitations for many uses.

The capability subclass is VIIs.

BoD—Bodine and Pailo gravelly loams, 12 to 20 percent slopes

This map unit consists of areas of Bodine and Pailo soils. The Bodine soils are very deep and somewhat excessively drained. The Pailo soils are very deep and well drained. These soils are on hilly ridges extending southwest-northeast through the middle of the Sequatchie Valley. They are also at the base of the Cumberland Plateau Escarpment on the east side of the valley. Individual areas of the soils are generally large enough to map separately. However, the soils were mapped as one unit because they are difficult to separate and because interpretations for anticipated uses are similar. They are difficult to delineate accurately because the high chert content makes them hard to examine with normal field equipment. Many mapped areas contain both soils, but some areas contain only one of the soils. The Bodine soils make up about 55 percent of the map unit and the Pailo soils make up 30 percent. The mapped areas are elongated or oval in shape and range from 5 to 30 acres in size.

Typical Profile

Bodine

Surface layer:
0 to 7 inches, dark grayish brown and brown gravelly loam

Subsoil:
7 to 27 inches, yellowish brown gravelly loam and very gravelly loam

27 to 63 inches, yellowish brown extremely gravelly clay loam

Pailo

Surface layer:
0 to 6 inches, dark brown and brown gravelly loam

Subsoil:
6 to 29 inches, yellowish brown gravelly loam and extremely gravelly loam
29 to 32 inches, yellowish red clay loam
32 to 65 inches, yellowish red clay

Included with this soil in mapping are small areas of Barger, Fullerton, and Minvale soils. Barger soils are mainly on summits of ridges, the highest part of the map unit, and in randomly scattered areas within the map unit. Fullerton soils are in randomly scattered areas in the map unit. Minvale soils are mainly on the lower part of slopes and on foot slopes. Also included, on ridges at the base of the Cumberland Plateau Escarpment, are areas of soils that are less than 40 inches deep to bedrock. These soils are on shoulders of ridges and on nose slopes.

Bodine Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: none

Pailo Soil Properties and Features

Permeability: Moderately rapid in the upper part; moderately slow in the lower part
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

Most of this map unit is in woodland or pasture.

These soils are not suited to row crops and are poorly suited to pasture because they are droughty. Drought-resistant grasses and legumes are the best suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in the best condition.

These soils are moderately suited to woodland use. Productivity is moderate or low for southern red oak, scarlet oak, chestnut oak, shortleaf pine, and Virginia pine. Undesirable plants reduce adequate natural or artificial reforestation without site preparation and maintenance. Seedling mortality is a problem on these soils because of droughtiness. The survival rate can be improved by planting at a higher rate or by using special stock that is larger and sturdier.

These soils are moderately suited or poorly suited to most urban uses. Steepness of slope, content of rock fragments, and high clay content in the lower part of the Pailo soils are severe limitations for many urban uses. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling.

The capability subclass is VIs.

BoE—Bodine and Pailo gravelly loams, 20 to 50 percent slopes

This map unit consists of areas of Bodine and Pailo soils. The Bodine soils are very deep and somewhat excessively drained. The Pailo soils are very deep and well drained. These soils are on steep ridges extending southwest-northeast through the middle of the Sequatchie Valley. They are also at the base of the Cumberland Plateau Escarpment on the east side of the valley. Individual areas of the soils are generally large enough to map separately. However, these soils were mapped as one unit because they are difficult to separate and because interpretations for anticipated uses are similar. They are difficult to delineate accurately because the high chert content makes them hard to examine with normal field equipment. Many mapped areas contain both soils, but some areas contain only one of the soils. The Bodine soils make up about 55 percent of the map unit and the Pailo soils make up 30 percent. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Bodine

Surface layer:
0 to 6 inches, dark grayish brown and brown gravelly loam

Subsoil:
6 to 24 inches, light yellowish brown gravelly loam and yellowish brown very gravelly loam
24 to 65 inches, yellowish brown extremely gravelly loam and strong brown extremely gravelly clay loam

Pailo

Surface layer:
0 to 5 inches, dark brown and brown gravelly loam

Subsoil:

5 to 27 inches, yellowish brown gravelly loam and extremely gravelly loam
26 to 31 inches, yellowish red clay loam
31 to 67 inches, yellowish red clay

Included with this soil in mapping are small areas of Barger, Fullerton, Minvale, and Tasso soils. Barger soils are mainly on summits of ridges, the highest part of the map unit, but also in randomly scattered areas within the map unit. Fullerton soils are in randomly scattered areas within the map unit. Minvale and Tasso soils are mainly on benches and foot slopes in the lower part of the map unit. Also included, on ridges at the base of the Cumberland Plateau Escarpment on the east side of the valley, are areas of soils less than 40 inches deep to bedrock and areas of Enders soils on nose slopes. Also included are areas of moderately deep to shallow soils on shoulders of ridges and nose slopes in the upper part of the map unit.

Bodine Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

Pailo Soil Properties and Features

Permeability: Moderately rapid in the upper part; moderately slow in the lower part
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid except the surface layer is less acid where limed
Depth to bedrock: More than 60 inches
Effective rooting depth: Deep
High water table: More than 6 feet
Flooding: None

In most areas these soils are in woodland. In a few areas they are used for pasture.

These soils are not suited to row crops and are poorly suited to pasture. Only drought-resistant grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in the best condition. Steepness of slope restricts the use of equipment.

These soils are moderately suited to woodland use. Productivity is moderate or low for southern red oak, scarlet oak, chestnut oak, shortleaf pine, and Virginia pine. Undesirable plants reduce adequate natural or artificial reforestation without site preparation and maintenance. The main limitation is steepness of slope. Cable yarding harvesting systems are safer, reduce damage to the soils, and help to maintain productivity. Planting and harvesting on the contour help to control erosion. Seedling mortality is a problem because of droughtiness. Planting seedlings at a higher rate and using special, larger and sturdier seedling stock will improve seedling survival.

These soils are poorly suited to most urban uses. Steepness of slope and the high content of stones and gravel are severe limitations for most urban uses. The high clay content in the lower part of the Pailo soils is also a limitation for septic tank absorption fields and sanitary landfills.

The capability subclass is VIIs.

Br—Bonair loam, occasionally flooded

This is a deep, poorly drained and nearly level soil. It is on narrow flood plains and in drainageways on the Cumberland Plateau. Slopes are 0 to 2 percent. The mapped areas are elongated in shape and range from 5 to 20 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, very dark gray loam

Subsoil:
9 to 49 inches, light brownish gray loam

Substratum:
49 to 64 inches, light brownish gray fine sandy loam

Bedrock:
64 inches, sandstone

Included with this soil in mapping are small areas of Sewanee soils. Sewanee soils are mainly near the edge of the map unit. Also included are small areas of poorly drained soils that are similar to the Bonair soil but that do not have a dark surface layer.

Bonair Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to 70 inches
High water table: 0 to 1 foot; December-April
Flooding: Occasional; very brief; December-April

In most areas this soil is in woodland. The rest is used for pasture.

This soil is poorly suited to most row crops because of wetness and flooding. Short-season crops, such as some varieties of soybeans, are best suited. The soil is

moderately suited to pasture of such water-tolerant plants as tall fescue and ladino clover. Proper stocking rates, fertilization, restricted grazing during wet periods, and periodic mowing and clipping help to keep the pasture in good condition.

This soil is moderately suited to woodland use. Productivity is moderate or high for sweetgum and willow oak. Because undesirable plants prevent adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Site preparation, such as chopping, burning, and herbicide application, helps to reduce debris, reduce immediate plant competition, and facilitate mechanical planting. Special site preparation, such as harrowing and bedding, helps to establish seedlings, to reduce seedling mortality, and to increase early seedling growth. Using conventional wheeled or tracked equipment when the soil is wet causes rutting and compaction. Puddling occurs when the soil is wet. Low-pressure ground equipment reduces damage to the soil and helps to maintain productivity.

This soil is not suited to most urban uses because flooding and wetness are severe limitations. For most areas these limitations are not feasible to overcome.

The capability subclass is IVw.

BuF—Bouldin stony loam, 20 to 75 percent slopes, bouldery

This is a very deep, well drained, steep or very steep soil. It is on long, concave side slopes and head slopes on the Cumberland Plateau Escarpment. A nearly vertical sandstone cliff is at the upper part of most large mapped areas. Boulders of sandstone with widths of 2 to 20 feet cover 0.01 to 0.1 percent of the surface on the middle part of back slopes to more than 15 percent of the surface at the head of coves and directly below the sandstone cliff. The mapped areas are elongated in shape and are predominantly more than 1,000 acres in size.

Typical Profile

Surface layer:
0 to 8 inches, very dark grayish brown and brown stony loam

Subsoil:
8 to 20 inches, yellowish brown cobbly loam
20 to 36 inches, strong brown very stony loam
36 to 70 inches, yellowish red very stony clay loam

Included with this soil in mapping are small areas of Allen and Nella soils. These soils are generally on benches or on the lower part of slopes, but they are also scattered throughout this map unit. Also included are small areas of Carbo, Enders, and Talbott soils and areas of limestone outcrops. These soils and rock outcrops are on convex nose slopes in the lower part of this map unit. Also included, in the upper part of this map unit, are soils that are similar to the Bouldin soil but that are less than 60 inches deep to sandstone or shale.

Bouldin Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Low or moderate
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

This soil is in woodland (fig. 6). Except for a few areas at the foot of the escarpment, it is not suited to row crops or pasture. Steepness of slopes and the large number of stones and boulders on the surface are the major limitations.

This soil is moderately suited to woodland use. Productivity is moderately high for upland oaks and yellow-poplar. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Steepness of slope and content of stones and boulders are significant limitations for woodland use and management. These limitations restrict the methods used in site preparation for reforestation. Steepness of slope and content of stones and boulders on the surface also restrict the use of wheeled or tracked equipment for harvesting. The boulders can hinder felling operations and damage timber when felled. Cable yarding harvesting systems are safer, reduce damage to the soil, and help to maintain productivity. Although the available water capacity of this soil is low or moderate, it is recharged from geologic formations on the escarpment; hence, in many areas under normal conditions, plant growth is generally not affected.

This soil is not suited to most urban uses because steepness of slope, high content of stones and boulders, and slippage are severe limitations. These limitations are very difficult to overcome.

The capability subclass is VIIs.

CaB—Capshaw silt loam, 2 to 5 percent slopes

This is a deep, moderately well drained, gently sloping soil. It is on terraces and broad toe slopes on uplands in the Sequatchie Valley. The mapped areas are irregular or elongated in shape and range from 5 to 50 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, brown silt loam

Subsoil:
9 to 20 inches, yellowish brown silty clay loam
20 to 52 inches, yellowish brown clay that has mottles in shades of gray

Substratum:
52 to 60 inches, light olive brown clay that has mottles in shades of gray

Included with this soil in mapping are small areas of Colbert, Swafford, and Talbott soils. Colbert and Talbott soils are mainly on the upper part of this map unit. Swafford soils are mainly on the lower part of this map unit.

Capshaw Soil Properties and Features

Permeability: Moderately slow
Available water capacity: Moderate or high
Soil reaction: Strongly acid to slightly alkaline
Depth to bedrock: 48 to 84 inches
Effective rooting depth: Deep
High water table: 3.5 to 5 feet; December-March
Flooding: None

In most areas this soil is used for pasture or row crops. In a few areas it is in woodland.

This soil is well suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. It is well suited to pasture and hay. Many grasses and legumes are suited. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition and to control erosion. Periodic mowing and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, loblolly pine, and upland oaks. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation is used. This includes chopping, burning, and herbicide application. Using conventional wheeled

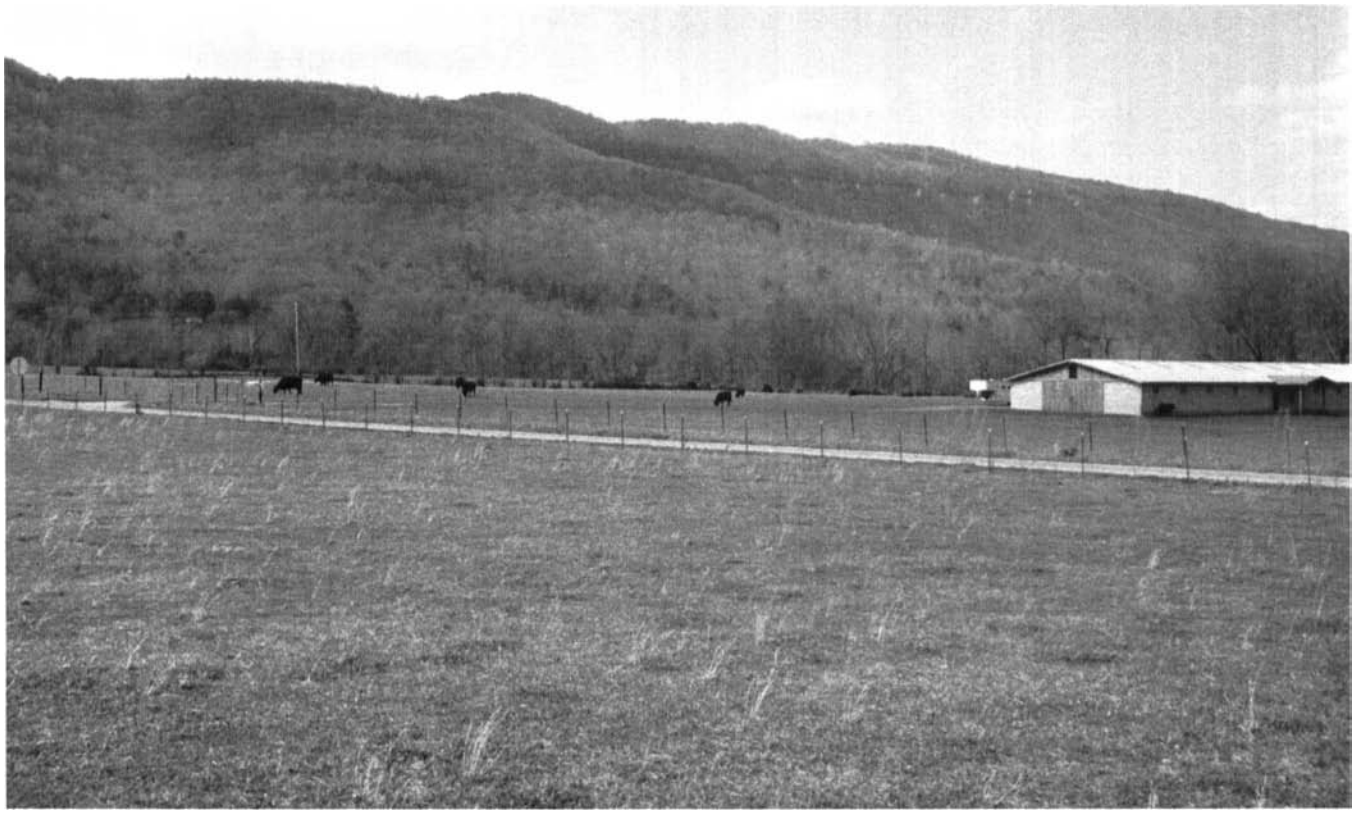

Figure 6.—Bouldin stony loam, 20 to 75 percent slopes, bouldery, is used as woodland, mainly hardwoods and pine. In the foreground is the Sequatchie Valley.

or tracked equipment when the soil is wet causes rutting and compaction.

This soil is moderately suited or poorly suited to most urban uses. Low strength, wetness, shrinking and swelling, and the clayey subsoil are limitations for many urban uses. Septic tank absorption fields are poorly suited because of the seasonal high water table and the moderately slow permeability. Adding coarse gravel to the road base overcomes the low strength for local roads and streets.

The capability subclass is IIe.

CbF—Carbo-Rock outcrop complex, 20 to 60 percent slopes

This map unit consists of the Carbo soil and areas of Rock outcrop. The Carbo soil is moderately deep, well drained, and steep and very steep. Rock outcrop consists of areas where limestone crops out on the surface. This soil and rock outcrops are mainly on convex nose slopes and side slopes on the middle and lower parts of the Cumberland Plateau Escarpment. The unit is 40 to 65 percent Carbo soil and 30 to 50 percent rock outcrops. The outcrops extend from 12 inches to more than 10 feet above the soil surface. The outcrops are mainly in contour bands around the slope. Vertical cliffs are in some places. The mapped areas are elongated in shape and range from 10 to more than 150 acres in size. The Carbo soil and limestone outcrops are so intricately mixed that they could not be separated at the scale used for mapping.

Typical Profile

Surface layer:
0 to 2 inches, very dark grayish brown silt loam

Subsoil:
2 to 5 inches, dark yellowish brown silty clay loam
5 to 30 inches, dark yellowish brown clay

Bedrock:
30 inches, hard limestone

Included with this soil in mapping are small areas of Allen, Bouldin, and Nella soils. These soils are on concave benches and along drainageways. Also included are areas of Talbott soils and areas of soils more than 40 inches deep over bedrock. These soils are in randomly scattered areas in this map unit.

Carbo Soil Properties and Features

Permeability: Slow
Available water capacity: Low or moderate
Soil reaction: Moderately acid to slightly alkaline
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

The Carbo soil is in woodland.

This map unit is not suited to row crops and pasture. Steepness of slope, depth to bedrock, low or moderate available water capacity, and rock outcrops are significant limitations.

This map unit is moderately suited or poorly suited to woodland use. Productivity is moderate for upland oaks and Virginia pine. Steepness of slope and rockiness are significant limitations for woodland use and management. These limitations restrict the methods used in site preparation and the use of equipment in harvesting operations. Rock outcrops may cause felled timber to break. Cable systems that fully or partially suspend logs are generally safer and disturb less soil. They also cause less erosion than conventional wheeled or tracked equipment.

This map unit is not suited to most urban uses because of steepness of slope, rockiness, depth to bedrock, shrinking and swelling, the high clay content, slow permeability, and low strength. These are limitations difficult to overcome.

The capability subclass is VIIs.

CoA—Cobstone cobbly fine sandy loam, 0 to 3 percent slopes, rarely flooded

This is a very deep, well drained, nearly level soil. It is on alluvial fans and low terraces in coves at the base of the Cumberland Plateau Escarpment. The mapped areas are mainly elongated in shape and range from 5 to 150 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown cobbly fine sandy loam

Subsoil:
4 to 10 inches, strong brown cobbly fine sandy loam
10 to 26 inches, strong brown very cobbly sandy loam
26 to 50 inches, strong brown extremely cobbly sandy clay loam

Substratum:
50 to 70 inches, strong brown extremely cobbly sandy clay loam

Included with this soil in mapping are small areas of Sequatchie and Sullivan soils. Sequatchie soils are in randomly scattered areas in this map unit. Sullivan soils are mainly adjacent to drainageways in the lowest part of this map unit. Also included are small

areas of soils similar to the Cobstone soil but that are 15 to 35 percent cobbles and stones.

Cobstone Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
Effective rooting depth: Deep
High water table: More than 6 feet
Flooding: Rare

In most areas this soil is in woodland. The rest is used as pasture. In many areas used for pasture, the surface has been cleared of cobbles and stones. Some of the cleared areas have reverted to woodland.

Except where the surface has been cleared of cobbles and stones, this soil is not suited to row crops or hay and is poorly suited to pasture. Drought-resistant grasses, such as tall fescue, are best suited.

This soil is moderately suited to woodland use. Productivity is moderately high for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. The cobbles and stones interfere with planting and harvesting equipment. Planting at a higher rate or using special planting stock that is containerized or larger than usual helps to reduce seedling mortality.

This soil is poorly suited to most urban uses. Flooding and numerous cobbles and stones are severe limitations for most uses.

The capability subclass is VIs.

CoB—Cobstone stony loam, 2 to 5 percent slopes

This is a very deep, well drained, gently sloping soil. It is on alluvial fans at the base of the Cumberland Plateau Escarpment. The mapped areas are mainly elongated in shape and range from 5 to 50 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown stony loam

Subsoil:
4 to 9 inches, dark yellowish brown stony loam
9 to 35 inches, yellowish brown and strong brown very cobbly loam

Substratum:
35 to 60 inches, yellowish brown extremely cobbly sandy loam

Included with this soil in mapping are small areas of Sequatchie and Sullivan soils. Sequatchie soils are in randomly scattered areas in this map unit. Sullivan soils are mainly adjacent to drainageways in the lowest part of this map unit. Also included are small areas of soils that are similar to the Cobstone soil but that are 15 to 35 percent cobbles and stones.

Cobstone Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland.

This soil is not suited to row crops, hay, or pasture because of numerous stones on the surface and the low available water capacity.

This soil is moderately suited to woodland use. Productivity is moderately high for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Numerous stones on the surface restrict use of equipment. In most areas mechanical planters are not practical. Planting at a higher rate or using special planting stock that is containerized or larger than usual helps to reduce seedling mortality.

This soil is moderately suited to most urban uses. Numerous stones on the surface and rock fragments throughout the soil are major limitations.

The capability subclass is VIIs.

CtC2—Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded

This map unit consists of areas of the deep, moderately well drained Colbert soil, the moderately deep, well drained Talbott soil, and the very deep, well drained Braxton soil. These soils are so intricately mixed that they could not be separated at the scale used for mapping. They are on convex uplands in the Sequatchie Valley. The unit is 30 to 50 percent Colbert soil, 20 to 30 percent Talbott soil, and 20 to 30 percent Braxton soil. The mapped areas are elongated or irregular in shape and range from 5 to 70 acres in size. On all these soils erosion has removed part of the

original surface layer and some of the subsoil has been mixed into the plow layer.

Typical Profile

Colbert

Surface layer:
0 to 7 inches, brown silty clay loam

Subsoil:
7 to 24 inches, strong brown and yellowish brown clay
24 to 41 inches, light olive brown clay that has mottles in shades of gray

Substratum:
41 to 52 inches, olive clay that has mottles in shades of gray

Bedrock:
52 inches, hard limestone

Talbott

Surface layer:
0 to 5 inches, brown silty clay loam

Subsoil:
5 to 21 inches, yellowish red clay
21 to 34 inches, strong brown and yellowish brown clay

Substratum:
34 to 37 inches, light olive brown clay

Bedrock:
37 inches, hard limestone

Braxton

Surface layer:
0 to 7 inches, brown silt loam

Subsoil:
7 to 34 inches, yellowish red clay
34 to 67 inches, strong brown and yellowish brown clay

Included with this soil in mapping are small areas of Capshaw, Holston, and Waynesboro soils. Capshaw soils are commonly along drainageways or in depressions in the lower part of this map unit. Holston and Waynesboro soils are in randomly scattered areas within this map unit. Also included are small, randomly scattered areas of soils less than 20 inches deep over bedrock.

Soil Properties and Features

Colbert

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly alkaline
Depth to bedrock: 40 to 60 inches
High water table: 3.5 to 5 feet; December-March
Flooding: None

Talbott

Permeability: Moderately slow
Available water capacity: Low or moderate
Soil reaction: Strongly acid to slightly alkaline
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

Braxton

Permeability: Moderately slow
Available water capacity: Moderate or high
Soil reaction: Strongly acid to slightly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas these soils are used as pasture. The rest are used for row crops or woodland.

These soils are poorly suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is moderately suited to pasture. Drought-resistant grasses and legumes, such as tall fescue, are best suited (fig. 7). Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

These soils are well suited to woodland use. Productivity is moderate for upland oaks, loblolly pine, and eastern redcedar. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Using conventional wheeled or tracked equipment when the soil is wet causes rutting and compaction.

These soils are poorly suited to many urban uses. Depth to bedrock, shrinking and swelling, moderately slow to very slow permeability, high clay content, and low strength are significant limitations for many uses.

The capability subclass is IVe.

CtD2—Colbert-Talbott-Braxton complex, 12 to 20 percent slopes, eroded

This map unit consists of areas of the deep, moderately well drained Colbert soil, the moderately deep, well drained Talbott soil, and the very deep, well

Figure 7.—Tall fescue-clover hay and pasture are effective in controlling erosion. The soils are the Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded.

drained Braxton soil. These soils are so intricately mixed that they could not be separated at the scale used for mapping. They are on convex uplands in the Sequatchie Valley. The unit is 30 to 50 percent Colbert soil, 20 to 30 percent Talbott soil, and 20 to 30 percent Braxton soil. The mapped areas are elongated or irregular in shape and range from 5 to 50 acres in size. On all these soils erosion has removed part of the original surface layer and some of the subsoil is mixed into the plow layer.

Typical Profile

Colbert

Surface layer:
0 to 5 inches, brown silty clay loam

Subsoil:
5 to 21 inches, strong brown and yellowish brown clay
21 to 38 inches, light olive brown clay that has mottles in shades of gray

Substratum:
38 to 46 inches, light olive brown clay that has mottles in shades of gray
46 inches, hard limestone

Talbott

Surface layer:
0 to 5 inches, brown silty clay loam

Subsoil:
5 to 20 inches, yellowish red clay
20 to 27 inches, strong brown clay

Substratum:
27 to 29 inches, yellowish brown clay
29 inches, hard limestone

Braxton

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 31 inches, yellowish red clay

31 to 63 inches, strong brown and yellowish brown clay

Included with these soils in mapping are small areas of Capshaw, Holston, and Waynesboro soils. Capshaw soils are commonly along drainageways in the lower part of this unit. Holston and Waynesboro soils are in randomly scattered areas within this map unit. Also included are small, randomly scattered areas of soils less than 20 inches deep over bedrock.

Soil Properties and Features

Colbert

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly alkaline
Depth to bedrock: 40 to 60 inches
High water table: 3.5 to 5 feet; December-March
Flooding: None

Talbott

Permeability: Moderately slow
Available water capacity: Low or moderate
Soil reaction: Strongly acid to slightly alkaline
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

Braxton

Permeability: Moderately slow
Available water capacity: Moderate or high
Soil reaction: Strongly acid to slightly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used as pasture. The rest is woodland.

These soils are generally not suited to row crops. Steepness of slope, the moderate available water capacity, and the severe erosion hazard are the main limitations. These soils are moderately suited to pasture. Drought-resistant grasses and legumes, such as tall fescue, are best suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

These soils are moderately suited to woodland use. Productivity is moderate for upland oaks, loblolly pine, and eastern redcedar. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Erosion is a moderate hazard on these soils during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

These soils are poorly suited to most urban uses. Steepness of slope, depth to bedrock, shrinking and swelling, moderately slow to very slow permeability, high clay content, and low strength are severe limitations for many urban uses. These limitations are difficult and expensive to overcome.

The capability subclass is VIe.

CxD—Colbert-Talbott-Rock outcrop complex, 5 to 20 percent slopes

This map unit consists of the Colbert and Talbott soils and areas of Rock outcrop. The Colbert soil is deep and moderately well drained. The Talbott soil is moderately deep and well drained. These soils and Rock outcrop are so intricately mixed they could not be separated at the scale used for mapping. They are on convex ridges, nose slopes, and side slopes in the Sequatchie Valley. The unit is made up of 40 to 60 percent Colbert soil, 20 to 40 percent Talbott soil, and 10 to 20 percent Rock outcrop. The Rock outcrop consists of areas where limestone crops out 3 to 24 inches above the surface. The outcrops mainly extend in bands across the slope. The mapped areas are elongated or irregular in shape and range from 5 to 50 acres in size.

Typical Profile

Colbert

Surface layer:
0 to 5 inches, dark brown and light yellowish brown silt loam

Subsoil:
5 to 10 inches, strong brown silty clay loam
10 to 25 inches, yellowish brown clay
25 to 44 inches, light olive brown clay that has mottles in shades of gray

Substratum:
44 to 49 inches, light olive brown clay that has mottles in shades of gray

Bedrock:
49 inches, hard limestone

Talbott

Surface layer:
0 to 5 inches, dark brown and yellowish brown silt loam

Subsoil:
5 to 9 inches, strong brown silty clay loam

9 to 23 inches, yellowish red clay
23 to 31 inches, strong brown clay

Substratum:
31 to 35 inches, light olive brown clay

Bedrock:
35 inches, hard limestone

Included with these soils in mapping are randomly scattered, small areas of Braxton soils and soils less than 20 inches deep to bedrock.

Soil Properties and Features

Colbert

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly alkaline
Depth to bedrock: 40 to 60 inches
High water table: 3.5 to 5 feet; December-March
Flooding: None

Talbott

Permeability: Moderately slow
Available water capacity: Low or moderate
Soil reaction: Strongly acid to slightly alkaline
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas these soils are in woodland. The rest are used for pasture.

These soils are not suited to row crops. They are poorly suited to pasture. Steepness of slope, depth to bedrock, low or moderate available water capacity, and rock outcrops are significant limitations.

These soils are moderately suited to woodland use. Productivity is moderate for upland oaks, loblolly pine, and eastern redcedar. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. In some areas rock outcrops restrict methods used in site preparation and hinder use of equipment in harvesting.

These soils are poorly suited to most urban uses. Steepness of slope, rockiness, depth to bedrock, shrinking and swelling, moderately slow to very slow permeability, high clay content, and low strength are severe limitations for most urban uses. These limitations are difficult and expensive to overcome.

The capability subclass is VIs.

EnE—Enders silt loam, 20 to 50 percent slopes

This is a deep, well drained and steep soil. It is on convex side slopes of shale ridges at the base of the Cumberland Plateau Escarpment. The mapped areas are elongated in shape and range from 5 to 50 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, very dark grayish brown and light yellowish brown silt loam

Subsoil:
5 to 9 inches, strong brown silty clay loam that has mottles in shades of red
9 to 38 inches, yellowish red clay and channery clay
38 to 50 inches, yellowish red very channery silty clay

Substratum:
50 to 55 inches, soft shale

Included with this soil in mapping are small areas of Allen, Colbert, Nella, and Talbott soils. Allen and Nella soils are on foot slopes or along drainageways that dissect the map unit. Colbert and Talbott soils are on nose slopes in the lower part of this map unit. Also included, on nose slopes and shoulders in the upper part of this map unit, are soils less than 40 inches deep to shale bedrock.

Soil Properties and Features

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to 60 inches
High water table: More than 6 feet
Flooding: None

In almost all areas this soil is in woodland. The rest is used for pasture.

This soil is not suited to row crops and is poorly suited to hay and pasture. Steep slopes, droughtiness, and the slow permeability in the clayey subsoil are major limitations.

This soil is moderately suited to woodland use. Productivity is moderate or low for southern red oak, white oak, and shortleaf pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Because of steepness of slope, erosion is a hazard and use of suitable equipment is limited. Cable yarding

harvesting systems are safer, reduce damage to the soil, and help to control erosion and to maintain productivity.

This soil is not suited to most urban uses because steep slopes, very slow permeability, depth to bedrock, low strength, high clay content, and shrinking and swelling are severe limitations. These limitations are difficult and expensive to overcome.

The capability subclass is VIIe.

EtB—Etowah silt loam, 2 to 5 percent slopes

This is a very deep, well drained, gently sloping soil. It is on high stream terraces in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, dark brown silt loam

Subsoil:
9 to 23 inches, brown silt loam and strong brown silty clay loam
23 to 72 inches, yellowish red and red silty clay loam

Included with this soil in mapping are small areas of Holston, Sequatchie, Swafford, and Waynesboro soils. Holston soils are in randomly scattered areas in this map unit. Sequatchie and Swafford soils are on terraces and toe slopes in the lower part of the map unit. Waynesboro soils are on convex slopes in the upper part of the map unit.

Etowah Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for row crops or hay. In a few areas it is in woodland. The rest is used for pasture.

This soil is well suited to row crops. Slope and erosion are the main limitations. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay crops. All adapted grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is high for upland oaks, shortleaf pine, and loblolly pine. It is moderately high for yellow-poplar. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited to most urban uses. Low strength and the clay content in the lower part of the subsoil are limitations for some uses. Good engineering design and construction practices easily overcome these limitations.

The capability subclass is IIe.

EtC2—Etowah silt loam, 5 to 12 percent slopes, eroded

This is a very deep, well drained and moderately sloping soil. It is on high stream terraces and foot slopes in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 30 acres in size. Erosion has removed part of the original surface layer.

Typical Profile

Surface layer:
0 to 9 inches, dark brown silt loam

Subsoil:
9 to 22 inches, strong brown silty clay loam
22 to 65 inches, yellowish red and red silty clay loam

Included with this soil in mapping are small areas of Holston, Minvale, Sequatchie, and Waynesboro soils. Holston and Minvale soils are in randomly scattered areas within the map unit. Sequatchie soils are on toe slopes and along drainageways in the lower part of this map unit. Waynesboro soils are on convex slopes mainly in the upper part of this map unit.

Etowah Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for pasture, hay, or row crops. In a few areas it is in woodland.

This soil is moderately suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface,

contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay crops. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is high for upland oaks, shortleaf pine, and loblolly pine and moderately high for yellow-poplar. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited or moderately suited to most urban uses. Steepness of slope, low strength, and clay content in the lower part of the subsoil are limitations for some uses. Good engineering design and construction practices can overcome these limitations. Constructing and grading on the contour help to overcome slope.

The capability subclass is IIIe.

FnC2—Fullerton gravelly silt loam, 5 to 15 percent slopes, eroded

This is a very deep, well drained, sloping soil. It is on convex ridges and upper side slopes in the Sequatchie Valley. Erosion has removed part of the original surface layer. The mapped areas are elongated in shape and range from 5 to 15 acres in size.

Typical Profile

Surface layer:
0 to 8 inches, brown gravelly silt loam

Subsoil:
8 to 12 inches, strong brown gravelly silty clay loam
12 to 63 inches, yellowish red and red gravelly clay

Included with this soil in mapping are small areas of Bodine, Minvale, and Pailo soils. Bodine and Pailo soils are in randomly scattered areas within this map unit. Minvale soils are mainly on the lower part of the map unit.

Fullerton Soil Properties and Features

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for pasture and hay. The rest is in woodland or is used for row crops.

This soil is moderately suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for shortleaf pine and moderate for southern red oak. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is moderately suited to most urban uses. Steepness of slope, low strength, and the clay content in the subsoil are moderate limitations for urban uses. These limitations can be overcome by good engineering design and construction practices including reinforcing foundations and properly compacting fills. Practices such as construction and grading on the contour help to overcome slope.

The capability subclass is IIIe.

FnE—Fullerton gravelly loam, 15 to 30 percent slopes

This is a very deep, well drained, steep soil. It is on convex side slopes of ridges in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 30 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, brown and light yellowish brown gravelly loam

Subsoil:
9 to 15 inches, strong brown gravelly loam
15 to 21 inches, yellowish red gravelly silty clay loam
21 to 72 inches, red gravelly clay

Included with this soil in mapping are small areas of Bodine, Minvale, and Pailo soils. Bodine and Pailo soils are commonly in the upper part of this map unit but are also in randomly scattered areas within the map unit. Minvale soils are on foot slopes and benches within the map unit.

Fullerton Soil Properties and Features

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid

Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for pasture or woodland.

This soil is poorly suited to row crops and hay. It is moderately suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion. Steepness of slope restricts use of equipment.

This soil is moderately suited for woodland use. Productivity is moderate for southern red oak and shortleaf pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Because of the steep slopes, erosion is a hazard and use of equipment is limited. Cable yarding harvesting systems are safer, reduce damage to the soil, and help to maintain productivity. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is poorly suited to many urban uses. Steepness of slope is a severe limitation for most uses. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling. Low strength and the clay content of the subsoil are moderate limitations for some uses.

The capability subclass is VIe.

GpC—Gilpin channery silt loam, 6 to 12 percent slopes

This is a moderately deep, well drained, rolling soil. It is on convex ridges on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, very dark grayish brown and yellowish brown channery silt loam

Subsoil:
5 to 10 inches, yellowish brown channery silt loam
10 to 24 inches, yellowish brown and brownish yellow channery silty clay loam

Substratum:
24 to 30 inches, brownish yellow very channery silt loam
30 to 45 inches, soft, weathered siltstone and shale

Included with this soil in mapping are small areas of Beersheba, Lily, and Lonewood soils. Beersheba and Lily soils are mainly near the edge of this map unit. Lonewood soils are mainly on broad ridgetops.

Gilpin Soil Properties and Features

Permeability: Moderate
Available water capacity: Moderate or low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture.

This soil is moderately suited to row crops. Droughtiness, steepness of slope, and erosion hazard are the main limitations. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture if drought-tolerant grasses and legumes are used. Deep-rooted plants such as alfalfa are poorly suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is moderately suited or poorly suited to most urban uses because of depth to bedrock and steepness of slope. It is poorly suited to septic tank absorption fields because of depth to bedrock.

The capability subclass is IIIe.

GpD—Gilpin channery silt loam, 12 to 20 percent slopes

This is a moderately deep, well drained, hilly soil. It is on convex side slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 75 acres in size.

Typical Profile

Surface layer:
0 to 6 inches, very dark grayish brown and yellowish brown channery silt loam

Subsoil:
6 to 25 inches, yellowish brown channery silt loam

Substratum:
25 to 31 inches, yellowish brown very channery silt loam
31 to 45 inches, soft weathered siltstone and shale

Included with this soil in mapping are small areas of Jefferson, Lily, Ramsey, and Sewanee soils. Jefferson soils are mainly on concave foot slopes in the lower part of this map unit. Lily and Ramsey soils are mainly on ridgetops and shoulders in the upper part of this map unit. Sewanee soils are moderately well drained. They are on flood plains and in drainageways in the lower part of this map unit.

Gilpin Soil Properties and Features

Permeability: Moderate
Available water capacity: Moderate or low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture.

This soil is poorly suited to row crops. Droughtiness, steepness of slope, and erosion hazard are the main limitations. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is moderately well suited to pasture of drought-tolerant grasses and legumes. It is poorly suited to such deep-rooted plants as alfalfa. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Erosion is a moderate hazard during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer. Erosion is a moderate hazard.

This soil is poorly suited to many urban uses. Steepness of slope and depth to bedrock are severe limitations for most uses. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling.

The capability subclass is IVe.

GpE—Gilpin channery silt loam, 20 to 45 percent slopes

This is a moderately deep, well drained, steep soil. It is on convex side slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 150 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown and brown channery loam

Subsoil:
4 to 25 inches, yellowish brown channery silt loam
25 to 30 inches, yellowish brown very channery silt loam

Substratum:
30 to 34 inches, strong brown very channery silt loam
34 to 45 inches, soft weathered shale and siltstone

Included with this soil in mapping are small areas of Jefferson, Lily, and Ramsey soils. Jefferson soils are mainly on concave foot slopes and along drainageways in the lower part of this map unit. Lily and Ramsey soils are mainly on convex shoulders in the upper part of this map unit.

Gilpin Soil Properties and Features

Permeability: Moderate
Available water capacity: Low or moderate
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. In a few areas it is used for pasture.

This soil is not suited to row crops and is poorly suited to pasture. Steepness of slope and erosion hazard are severe limitations. Drought-tolerant grasses and legumes are best suited. Steep slopes restrict use of equipment in pasture management.

This soil is moderately suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. The main limitation is steepness of slope. Cable yarding harvesting systems are safer, reduce damage to the soil, and help to maintain productivity. Controlling erosion requires careful use of equipment

and a layout of roads and skid trails that preserves the duff layer.

This soil is poorly suited to most urban uses because of steep slopes and depth to bedrock. These are limitations difficult to overcome.

The capability subclass is VIe.

GrF—Gilpin-Ramsey-Rock outcrop complex, 20 to 60 percent slopes

This map unit consists of areas of Gilpin and Ramsey soils and areas of Rock outcrop. The Gilpin soil is moderately deep and well drained. The Ramsey soil is shallow and somewhat excessively drained. Rock outcrop consists of areas where sandstone crops out on the surface. These soils and areas of Rock outcrop are so intricately mixed they could not be separated at the scale selected for mapping. They are on convex side slopes on the Cumberland Plateau. The Gilpin soil makes up 55 to 75 percent of mapped areas, the Ramsey soil 10 to 20 percent, and sandstone outcrops 5 to 15 percent. The mapped areas are elongated in shape and range from 20 to 400 acres in size.

Typical Profile

Gilpin

Surface layer:
0 to 3 inches, dark grayish brown stony loam

Subsoil:
3 to 15 inches, yellowish brown channery loam
15 to 28 inches, yellowish brown channery silty clay loam
28 to 33 inches, yellowish brown very channery silt loam

Substratum:
33 to 45 inches, soft weathered siltstone and shale

Ramsey

Surface layer:
0 to 4 inches, dark brown and brown stony loam

Subsoil:
4 to 14 inches, yellowish brown stony loam

Substratum:
14 inches, hard sandstone

Rock outcrop consists of sandstone as individual rocks and as ledges that follow the contour of the slope. The rocks extend a few inches to about 5 feet above the surface.

Included with this unit in mapping are small areas of Lily and Jefferson soils. Lily soils are mainly on shoulders in the upper part of this map unit. Jefferson soils are mainly on concave areas in the lower part of this map unit. Also included, mainly below rock outcrops or along drainageways, are small areas of stony soils that have a high content of stones and boulders on the surface and throughout the soil profile.

Soil Properties and Features

Gilpin

Permeability: Moderate
Available water capacity: Moderate or low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

Ramsey

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 7 to 20 inches
High water table: More than 6 feet
Flooding: None

In almost all areas these soils are in woodland.

These soils are not suited to row crops or pasture. Steepness of slope, depth to bedrock, rock outcrops, and stoniness are very severe limitations.

This unit is moderately suited to woodland use. Productivity is moderate or low for upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Steepness of slope, stoniness, and depth to bedrock are significant limitations for woodland use and management. These limitations restrict use of equipment for harvesting and methods used in site preparation for reforestation. Cable yarding harvesting systems are generally safer, reduce soil damage, and help to maintain productivity.

This map unit is not suited to most urban uses. Steepness of slope, stoniness, and depth to bedrock are severe limitations. These limitations are very difficult and expensive to overcome.

The capability subclass is VIIs.

Ha—Hamblen loam, occasionally flooded

This is a very deep, moderately well drained, nearly level soil. It is on flood plains along the Sequatchie River and along tributary streams in the Sequatchie Valley. Slopes are 0 to 2 percent. The mapped areas

are elongated in shape and range from 5 to 50 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, dark brown loam

Subsoil:
9 to 20 inches, dark yellowish brown and yellowish brown loam
20 to 36 inches, yellowish brown loam that has mottles in shades of gray
36 to 44 inches, yellowish brown silt loam that has mottles in shades of gray

Substratum:
44 to 65 inches, light brownish gray silt loam that has mottles in shades of brown

Included with this soil in mapping are small areas of Melvin, Newark, Sullivan, and Whitwell soils. Melvin and Newark soils are in slight depressions. Sullivan soils are mainly adjacent to drainageways. Whitwell soils are on low stream terraces in the highest part of the unit. Also included, near the banks of larger drainageways, are narrow areas of somewhat excessively drained soils that are sandier than the Hamblen soil.

Hamblen Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid to neutral
Depth to bedrock: More than 60 inches
High water table: 2 to 3 feet; December-March
Flooding: Occasional; very brief; December-March

In most areas this soil is used for pasture and hay. It commonly occurs in narrow strips adjacent to steeper areas used for hay and pasture. The rest is used for row crops.

This soil is well suited to row crops. But, many areas are small and elongated. Occasional flooding and moderate wetness in early spring are the main limitations. This soil is well suited to pasture and hay. Most grasses and legumes adapted to this area are suited. In late winter and early spring flooding and a high water table can damage such crops as alfalfa and wheat. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil. Periodic mowing and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is high for yellow-poplar and loblolly pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Using conventional wheeled or tracked equipment when the soil is wet causes rutting and compaction. Using low-pressure ground equipment reduces damage to the soil and helps to maintain productivity.

This soil is not suited to use as building sites and is poorly suited to most urban uses because of flooding. The seasonal high water table is a limitation for some urban uses.

The capability subclass is IIw.

HoB—Holston loam, 2 to 5 percent slopes

This is a very deep, well drained, gently sloping soil. It is on high stream terraces and foot slopes in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 50 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, brown loam

Subsoil:
9 to 22 inches, dark yellowish brown and yellowish brown loam
22 to 70 inches, strong brown clay loam

Included with this soil in mapping are small areas of Allen, Etowah, Sequatchie, and Swafford soils. Allen and Etowah soils are in the upper part of this map unit. Sequatchie and Swafford soils are on stream terraces and toe slopes in the lower part of this map unit.

Holston Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for row crops or hay. The rest is used for pasture.

This soil is well suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay crops. Most grasses and legumes are suited. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition and to control erosion. Periodic mowing

and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited to most urban uses. Good engineering design and construction practices can easily overcome most limitations.

The capability subclass is IIe.

HoC2—Holston loam, 5 to 12 percent slopes, eroded

This is a very deep, well drained, rolling soil. It is on high stream terraces and foot slopes in the Sequatchie Valley. Erosion has removed part of the original surface layer. The mapped areas are elongated in shape and range from 5 to 30 acres in size.

Typical Profile

Surface layer:
0 to 8 inches, brown loam

Subsoil:
8 to 18 inches, yellowish brown loam
18 to 65 inches, strong brown clay loam

Included with this soil in mapping are small areas of Allen, Etowah, Sequatchie, and Swafford soils. Allen and Etowah soils are in the upper part of this map unit. Sequatchie and Swafford soils are on stream terraces and toe slopes in the lower part of this map unit.

Holston Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for pasture and hay. The rest is used for row crops.

This soil is moderately suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay crops. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and loblolly pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It include chopping, burning, and herbicide application.

This soil is well suited to most urban uses. Steepness of slope is a major limitation. The design of structures and facilities can generally overcome slope and the other limitations.

The capability subclass is IIIe.

JeC—Jefferson loam, 5 to 12 percent slopes

This is a very deep, well drained, rolling soil. It is on concave foot slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 30 acres in size.

Typical Profile

Surface layer:
0 to 6 inches, dark brown loam

Subsoil:
6 to 61 inches, yellowish brown gravelly loam

Included with this soil in mapping are small areas of Lily and Lonewood soils. These soils are mainly near the edge of this map unit. Also included, mainly on alluvial fans and adjacent to drainageways, are small areas of stony soils that have more fragments on the surface and throughout the profile.

Jefferson Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture and row crops.

This soil is moderately suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping

help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is high for yellow-poplar and upland oaks. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited or moderately suited to most urban uses. Steepness of slope is a severe limitation for most urban uses. Constructing and grading on the contour help to overcome slope.

The capability subclass is IIIe.

JeD—Jefferson loam, 12 to 20 percent slopes

This is a very deep, well drained, hilly soil. It is mainly on concave foot slopes and head slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 6 inches, very dark grayish brown and dark yellowish brown loam

Subsoil:
6 to 14 inches, yellowish brown gravelly loam
14 to 56 inches, yellowish brown and strong brown gravelly clay loam
56 to 63 inches, strong brown gravelly loam

Included with this soil in mapping are small areas of Lily, Gilpin, and Ramsey soils. Lily and Ramsey soils are mainly on shoulders in the upper part of this map unit. Gilpin soils are mainly on convex nose slopes within this map unit. Also included, mainly along drainageways, are areas of stony soils that have more fragments on the surface and throughout the profile.

Jefferson Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In almost all areas this soil is in woodland. The rest is used for pasture.

This soil is poorly suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is high for yellow-poplar and upland oaks. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Erosion is a moderate hazard on this soil during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is moderately suited or poorly suited to most urban uses. Steepness of slope is the major limitation. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling.

The capability subclass is IVe.

JeE—Jefferson stony loam, 20 to 50 percent slopes

This is a very deep, well drained, steep soil. It is mainly on concave side slopes and head slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 30 to 250 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, very dark grayish brown stony loam

Subsoil:
4 to 27 inches, dark yellowish brown and brown stony loam
27 to 54 inches, dark yellowish brown stony loam
54 to 65 inches, yellowish brown very stony loam

Included with this soil in mapping are small areas of Lily, Ramsey, and Gilpin soils. Lily and Ramsey soils are mainly on shoulders in the upper part of this map unit. Gilpin soils are mainly on convex nose slopes in this map unit. Also included are small areas of sandstone outcrop in the upper part of this unit. Also included, in the upper part of this map unit below sandstone outcrops and along drainageways, are areas of soils that contain more stones and boulders than the Jefferson soil.

Jefferson Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

Almost all areas of this soil are in woodland.

This soil is not suited to row crops and is poorly suited to pasture because of steep slopes. Stones on the surface and slope limit use of equipment.

This soil is moderately suited to woodland use. Productivity is high for yellow-poplar and upland oaks. The main limitation is steepness of slope. Cable yarding harvesting systems are safer, help to control erosion, damage the soil less, and help to maintain productivity. Planting and harvesting on the contour help to control erosion.

This soil is not suited to most urban uses because the steepness of slope and large stones are severe limitations. These limitations are very difficult to overcome.

The capability subclass is VIIs.

LaB—Lily loam, 2 to 6 percent slopes

This is a moderately deep, well drained, gently sloping soil. It is on broad, convex uplands on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 50 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, dark brown and brown loam

Subsoil:
5 to 31 inches, yellowish brown loam

Substratum:
31 inches, hard sandstone

Included with this soil in mapping are small areas of Beersheba, Lonewood, and Ramsey soils. Beersheba soils are in randomly scattered areas in the map unit. Lonewood soils are mainly in broad, smooth areas in the upper part of the map unit. Ramsey soils are in more sloping areas mainly near the edge of the map unit.

Lily Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. In many areas it is isolated by the surrounding, extensive forests. In some areas it is used for pasture and row crops.

In cleared areas this soil is well suited to row crops. Slope, erosion hazard, and moderate available water capacity are the main limitations for row crops. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is moderately suited or poorly suited to urban use. Depth to bedrock is the main limitation for many urban uses. The soil is poorly suited to septic tank absorption fields and dwellings with basements because of depth to bedrock.

The capability subclass is IIe.

LaC—Lily loam, 6 to 12 percent slopes

This is a moderately deep, well drained, rolling soil. It is on upland ridges and side slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 200 acres in size.

Typical Profile

Surface layer:
0 to 3 inches, dark brown and brown loam

Subsoil:
3 to 30 inches, yellowish brown loam

Bedrock:
30 inches, hard sandstone

Included with this soil in mapping are small areas of Beersheba, Lonewood, Ramsey, and Sewanee soils. Beersheba soils are in randomly scattered areas in the map unit. Lonewood soils are mainly on ridges in the upper part of the map unit. Ramsey soils are mainly on

short, steep slopes near drainageways. Sewanee soils are in drainageways.

Lily Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. In many areas it is isolated by the surrounding, extensive forests. In some areas it is used for pasture and row crops.

In cleared areas this soil is moderately suited to row crops. Slope, erosion hazard, and moderate available water capacity are the main limitations for row crops. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Many grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is moderately suited or poorly suited to urban use. Depth to bedrock is the main limitation for many uses. The soil is poorly suited to septic tank absorption fields and dwellings with basements because of depth to bedrock.

The capability subclass is IIIe.

LaD—Lily loam, 12 to 20 percent slopes

This is a moderately deep, well drained, hilly soil. It is on upland side slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 150 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown and brown loam

Subsoil:
4 to 31 inches, yellowish brown loam

Substratum:
31 inches, hard sandstone

Included with this soil in mapping are small areas of Beersheba, Gilpin, Ramsey, and Sewanee soils. Beersheba soils are in randomly scattered areas within the map unit. Gilpin soils are above thin bands of shale that extend around the contour in some areas of the map unit. Ramsey soils are mainly on short steep slopes. Sewanee soils are in drainageways.

Lily Soil Properties and Features

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Depth to bedrock: 20 to 40 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture.

This soil is poorly suited to row crops. Erosion is a hazard if row crops are grown. This soil is well suited to pasture. Many grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderate for upland oaks, shortleaf pine, loblolly pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Erosion is a moderate hazard during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is poorly suited to many urban uses. Depth to bedrock and steepness of slope are significant limitations difficult to overcome.

The capability subclass is IVe.

LoB—Lonewood silt loam, 2 to 5 percent slopes

This is a deep, well drained, gently sloping soil. It is on broad, smooth uplands on the Cumberland Plateau. The mapped areas are elongated or irregular in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown and brown silt loam

Subsoil:
4 to 22 inches, yellowish brown silt loam
22 to 47 inches, yellowish brown loam and strong brown clay loam

Substratum:
47 to 57 inches, strong brown loam
57 to 63 inches, soft, weathered sandstone

Included with this soil in mapping are small areas of Beersheba, Lily, and Sewanee soils. Beersheba and Lily soils are in randomly scattered areas within this map unit. Sewanee soils are in drainageways. Also included are similar soils that are redder in the upper part, contain more clay, and are deeper to bedrock than the Lonewood soil. Also included, mainly in the upper part of this map unit, are similar soils that have a slightly compact and brittle layer at a depth of about 2 feet.

Lonewood Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to 72 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. In many areas it is isolated by the surrounding, large tracts of woodland (fig. 8). In some areas the soil is used for pasture and row crops.

In cleared areas this soil is well suited to row crops.

Figure 8.—In many areas on the Cumberland Plateau, paper companies have planted loblolly pine for pulpwood. Lonewood silt loam, 2 to 5 percent slopes, is well suited to woodland use.

Erosion is a hazard where row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for upland oaks, loblolly pine, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited to many urban uses. Depth to bedrock and low strength are limitations for several uses. Good engineering design and construction practices on this soil include reinforcement of foundations and proper compaction of fills. Generally, they can overcome the limitations.

The capability subclass is IIe.

LoC—Lonewood silt loam, 5 to 12 percent slopes

This is a deep, well drained, rolling soil. It is mainly on broad ridges and long side slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 200 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, dark brown and brown silt loam

Subsoil:
5 to 30 inches, yellowish brown silt loam and loam
30 to 51 inches, strong brown clay loam
51 to 57 inches, strong brown loam

Substratum:
57 to 63 inches, soft, weathered sandstone

Included with this soil in mapping are small areas of Beersheba, Lily, and Sewanee soils. Beersheba and Lily soils are in randomly scattered areas within this map unit. Sewanee soils are in drainageways. Also included, mainly on ridgetops in the upper part of this map unit, are soils that are redder in the upper part, contain more clay, and are deeper to bedrock than the Lonewood soil.

Lonewood Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to 72 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. In many areas it is isolated by the surrounding, large tracts of woodland. In some areas it is used for pasture and row crops.

In cleared areas this soil is moderately suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for upland oaks, loblolly pine, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It include chopping, burning, and herbicide application.

This soil is moderately suited to most urban uses. Depth to bedrock, steepness of slope, and low strength are the main limitations to urban uses. Good engineering design and construction practices on this soil include reinforcement of foundations and proper compaction of fills. They can overcome the limitations for most uses. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling.

The capability subclass is IIIe.

Mn—Melvin and Newark silt loams, depressional

This map unit consists of very deep, poorly drained Melvin soils and very deep, somewhat poorly drained Newark soils. These soils are mainly in slight depressions on flood plains along the Sequatchie River and its tributaries. Individual areas of the soils are large enough to map separately in many areas, but because of present and predicted use, they were mapped as one unit. Many mapped areas contain both soils, but some areas contain either Melvin or Newark soils. Melvin soils make up about 60 percent of the map unit and Newark soils make up 30 percent. The mapped areas are elongated and irregular in shape and range from 5 to 50 acres in size.

Typical Profile

Melvin

Surface layer:
0 to 6 inches, grayish brown silt loam

Subsoil:
6 to 36 inches, light brownish gray and gray silt loam

Substratum:
36 to 66 inches, gray silt loam and light brownish gray loam

Newark

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 43 inches, brown and light brownish gray silt loam

Substratum:
43 to 68 inches, gray silt loam and loam

Included with this unit in mapping are small areas of Hamblen soils. Hamblen soils are moderately well drained. They are near the edge of the map unit and adjacent to drainageways. Also included, in random areas within some mapped areas, are soils that are similar to Lindside and Newark soils but that contain more sand.

Soil Properties and Features

Melvin

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid to neutral
Depth to bedrock: More than 60 inches
High water table: Ponded to 0.5 foot below the surface; November-May
Flooding: Frequent; very long; December-April

Newark

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid to neutral
Depth to bedrock: More than 60 inches
High water table: Ponded to 1 foot below the surface; November-May
Flooding: Frequent; very long; December-April

These soils are in woodland or used for pasture.

These soils are not suited to row crops. Wetness and flooding are significant limitations for row crops. These soils are poorly suited to pasture. Only the most water-tolerant plants are suited. Wetness restricts grazing. Ponding may kill pasture plants.

These soils are moderately suited to woodland use. Productivity is high for sweetgum and bottom land oaks. Because undesirable plants prevent adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Special site preparation, such as harrowing, herbicide application, and bedding, helps to establish seedlings, to reduce seedling mortality, and to increase early seedling growth. The high water table restricts the use of equipment to periods when the soils are dry. Use of conventional wheeled or tracked equipment when the soils are wet causes rutting and compaction. Puddling can occur when the soils are wet. Using low-pressure ground equipment reduces damage to the soils and helps to maintain productivity.

These soils are not suited to most urban uses because wetness and flooding are severe limitations. These limitations are very difficult to overcome.

The capability subclass is Vw.

MvC—Minvale gravelly loam, 6 to 12 percent slopes

This is a very deep, well drained, sloping soil. It is on concave foot slopes of ridges in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 30 acres in size.

Typical Profile

Surface layer:
0 to 6 inches, brown gravelly loam

Subsoil:
6 to 10 inches, yellowish brown gravelly loam
10 to 28 inches, strong brown and yellowish red gravelly silty clay loam
28 to 63 inches, red gravelly silty clay loam

Included with this soil in mapping are small areas of Bodine, Fullerton, Pailo, and Tasso soils. Bodine, Fullerton, and Pailo soils are on convex slopes above the Minvale soil. Tasso soils are in randomly scattered areas within this map unit.

Minvale Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet

Flooding: None

In most areas this soil is used for pasture. The rest is used for row crops or is in woodland.

This soil is moderately suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay crops. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and loblolly pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited to many urban uses. Steepness of slope is the main limitation for most uses. Good engineering design and construction practices can overcome most of the other few limitations for specific uses.

The capability subclass is IIIe.

MvD—Minvale gravelly loam, 12 to 20 percent slopes

This is a very deep, well drained, hilly soil. It is on concave foot slopes of ridges in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 40 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, dark grayish brown and brown gravelly loam

Subsoil:
5 to 9 inches, yellowish brown gravelly loam
9 to 30 inches, strong brown and yellowish red gravelly silty clay loam
30 to 53 inches, red gravelly silty clay loam
53 to 65 inches, strong brown gravelly clay

Included with this soil in mapping are small areas of Bodine, Fullerton, Pailo, and Tasso soils. Bodine, Fullerton, and Pailo soils are on convex slopes above the Minvale soil. Tasso soils are mainly in the lower part of this map unit.

Minvale Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland or is used for pasture.

This soil is poorly suited to row crops. Erosion is a hazard if row crops are grown. This soil is moderately suited to hay and well suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Slope is a moderate hazard to use of equipment. Erosion is a moderate hazard during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is moderately suited or poorly suited to most urban uses. Steepness of slope is the main limitation. Low strength and permeability are moderate limitations for some uses. In many areas designing structures and facilities to fit the landscape can overcome slope.

The capability subclass is IVe.

NeE—Nella stony loam, 12 to 30 percent slopes

This is a very deep, well drained, steep soil. It is on foot slopes of the Cumberland Plateau Escarpment. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 2 inches, dark grayish brown stony loam

Subsoil:
2 to 16 inches, yellowish brown and strong brown stony loam
16 to 28 inches, yellowish red stony clay loam
28 to 70 inches, red stony clay loam

Included with this soil in mapping are small areas of Allen, Bouldin, and Enders soils. Allen soils are in randomly scattered areas within this map unit. Bouldin soils are mainly in the upper part of this map unit and

in drainageways. Enders soils are on nose slopes in the middle part of this map unit.

Nella Soil Properties and Features

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In almost all areas this soil is in woodland. The rest is used for pasture.

This soil is not suited to row crops and hay. It is poorly suited to pasture. Stones on the surface and steepness of slope limit use of equipment. Most grasses and legumes are suited.

This soil is moderately suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Slope is a limitation for equipment. Cable yarding harvesting systems are safer, reduce damage to the soil, and help to maintain productivity. Erosion is a moderate hazard during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is poorly suited to most urban uses. Steepness of slope and large stones are severe limitations for most uses.

The capability subclass is VIs.

Pt—Pits, quarries

This map unit consists of limestone quarries at the base of the Cumberland Plateau Escarpment in the western part of the Sequatchie Valley. The quarries comprise pits and stockpiles of crushed stone. One quarry is active, the other inactive. The mapped areas are irregular in shape and range from 15 to more than 50 acres in size.

Pits, quarries, has not been assigned to an interpretative group.

RaC—Ramsey sandy loam, 5 to 15 percent slopes

This is a shallow, somewhat excessively drained, rolling and hilly soil. It is on convex ridges and side slopes on the Cumberland Plateau. The mapped areas are irregular or elongated in shape and range from 5 to 200 acres in size.

Typical Profile

Surface layer:
0 to 2 inches, dark brown sandy loam

Subsoil:
2 to 11 inches, dark yellowish brown loam
11 to 16 inches, dark yellowish brown cobbly loam

Bedrock:
16 inches, hard sandstone

Included with this soil in mapping are small areas of Beersheba and Lily soils. These soils are in randomly scattered areas within this map unit. Also included, in places, are small areas of sandstone outcrops.

Ramsey Soil Properties and Features

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 7 to 20 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture.

This soil is not suited to row crops because of the shallow depth to bedrock and the very low available water capacity. This soil is poorly suited to pasture because of low yields. Only drought-tolerant plants such as tall fescue are suited.

This soil is poorly suited to woodland use. Productivity is low for upland oaks, shortleaf pine, and Virginia pine. Seedling mortality is a problem on this droughty soil. Planting at a higher rate helps to overcome the problem. Windthrow is a severe limitation because of the shallow root zone.

This soil is poorly suited to most urban uses because of depth to bedrock. This limitation is very difficult to overcome for most uses.

The capability subclass is VIe.

RaE—Ramsey sandy loam, 15 to 35 percent slopes

This is a shallow, somewhat excessively drained, steep soil. It is on convex ridges and side slopes on the Cumberland Plateau. The mapped areas are elongated in shape and range from 5 to 300 acres in size.

Typical Profile

Surface layer:
0 to 4 inches, dark brown and brown sandy loam

Subsoil:
4 to 15 inches, yellowish brown loam

Bedrock:
15 inches, sandstone

Included with this soil in mapping are small areas of Beersheba, Lily, and Sewanee soils. Beersheba and Lily soils are in randomly scattered areas in this map unit. Sewanee soils are on narrow flood plains.

Ramsey Soil Properties and Features

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 7 to 20 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland. The rest is used for pasture.

This soil is not suited to row crops because of the shallow depth to bedrock and the very low available water capacity. This soil is poorly suited to pasture because of low yields. Only such drought-tolerant plants as tall fescue are suited.

This soil is poorly suited to woodland use. Productivity is low for upland oaks, shortleaf pine, and Virginia pine. Slope is a moderate limitation for equipment. Seedling mortality is a problem on this droughty soil. Planting at a higher rate helps overcome the problem. Windthrow is a severe limitation because of the shallow root zone.

This soil is poorly suited to most urban uses because of depth to bedrock and steepness of slope. These are very difficult limitations to overcome.

The capability subclass is VIIe.

RrE—Ramsey-Rock outcrop complex, 15 to 50 percent slopes

This map unit consists of the shallow, somewhat excessively drained, moderately steep and steep Ramsey soil and areas of Rock outcrop. Rock outcrop consists of outcroppings of sandstone bedrock. This soil and Rock outcrop are on convex side slopes on the Cumberland Plateau. The Ramsey soil makes up 50 to 70 percent of the map unit, and Rock outcrop makes up 20 to 40 percent. The mapped areas are elongated in shape and range from 5 to 250 acres in size. The Ramsey soil and Rock outcrop are in areas so intricately mixed or so small in size that they could not be separated at the scale used in mapping.

Typical Profile

Surface layer:
0 to 4 inches, dark brown and brown sandy loam

Subsoil:
4 to 15 inches, yellowish brown loam

Bedrock:
15 inches, hard sandstone

Included with this unit in mapping are small, randomly scattered areas of Lily soils. Also included, mainly in the lower part of this map unit, are small areas of soils that have a high content of stones and boulders on the surface and in the surface layer and the subsoil.

Ramsey Soil Properties and Features

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 7 to 20 inches
High water table: More than 6 feet
Flooding: None

In almost all areas the Ramsey soil is in woodland.

This Ramsey soil is not suited to row crops and is very poorly suited to pasture. Steepness of slope, very low available water capacity, depth to bedrock, and rock outcrops are significant limitations.

This soil is poorly suited to woodland use. Productivity is low for upland oaks, shortleaf pine, and Virginia pine. Slope and rock outcrops are hazards in operating equipment. Seedling mortality is a problem on this droughty soil. Planting at a higher rate helps to overcome the problem. Windthrow is a severe limitation because of the shallow root zone.

This soil is poorly suited to most urban uses because of depth to bedrock and steepness of slope. These limitations are very difficult to overcome.

The capability subclass is VIIs.

SaA—Sequatchie loam, 0 to 2 percent slopes

This is a very deep, well drained, nearly level soil. It is on terraces in the Sequatchie Valley. The mapped areas are elongated in shape and range from 10 to 300 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, dark brown loam

Subsoil:
9 to 46 inches, brown and strong brown loam

Substratum:
46 to 68 inches, strong brown cobbly sandy loam

Included with this soil in mapping are small areas of Cobstone, Swafford, and Whitwell soils. Cobstone soils are mainly on alluvial fans extending into this map unit. Swafford and Whitwell soils are mainly in slight depressions or at the edge of this map unit. Also included are small, random areas of cobbly soils that contain more cobbles than the Sequatchie soil but less than Cobstone soils.

Sequatchie Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for row crops or hay. The rest is used for pasture. In a few areas it is in woodland.

This soil is well suited to row crops, hay, and pasture. Most crops, grasses, and legumes are suited. Tomatoes, peppers, and other vegetable crops are especially well suited (fig. 9). This soil does not have any significant limitations for crop production. Proper stocking rates, fertilization, and periodic mowing and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is high for yellow-poplar, black walnut, upland oaks, and loblolly pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited to most urban uses. Good engineering design and construction practices can easily overcome most limitations.

The capability subclass is I.

SeA—Sequatchie loam, 0 to 2 percent slopes, rarely flooded

This is a very deep, well drained, nearly level soil. It is on low stream terraces in the Sequatchie Valley. The

Figure 9.—Sequatchie loam, 0 to 2 percent slopes, is well suited to tomatoes and other vegetable crops. This soil is among the most productive soils in the county.

mapped areas are elongated in shape and range from 10 to 250 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, dark brown loam

Subsoil:
9 to 24 inches, brown and strong brown loam
24 to 36 inches, strong brown clay loam
36 to 42 inches, strong brown loam

Substratum:
42 to 58 inches, strong brown loam
58 to 62 inches, yellowish brown sandy loam

Included with this soil in mapping are small areas of Cobstone, Sullivan, and Whitwell soils. Cobstone soils are mainly on alluvial fans extending into this map unit. Sullivan soils are on bottom lands. Whitwell soils are mainly in slight depressions. Also included are small, random areas of cobbly soils that contain more cobbles than the Sequatchie soil but less than Cobstone soils.

Sequatchie Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: Rare

In most areas this soil is used for row crops. In a few areas it is in woodland. The rest is used for pasture and hay.

This soil is well suited to row crops, pasture, and hay. Most crops, grasses, and legumes are suited. Although the soil is flooded under extreme conditions, crops are seldom damaged. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition. Periodic mowing and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is high for yellow-poplar, black walnut, upland oaks, and loblolly pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Site preparation, such as harrowing, herbicide application, and bedding, will reduce immediate plant competition and will increase early seedling growth.

This soil is poorly suited to many urban uses because of flooding. Flooding is rare, but a single flood can cause huge losses of residential or commercial development.

The capability subclass is I.

SeB—Sequatchie loam, 2 to 6 percent slopes

This is a very deep, well drained, gently sloping soil. It is on low terraces along drainageways that extends from coves at the base of the Cumberland Plateau Escarpment to the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 70 acres in size.

Typical Profile

Surface layer:
0 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, brown and strong brown loam
24 to 39 inches, strong brown clay loam
39 to 45 inches, strong brown loam

Substratum:
45 to 60 inches, strong brown cobbly loam

Included with this soil in mapping are small areas of Cobstone, Swafford, and Whitwell soils. Cobstone soils are mainly on alluvial fans extending into this map unit. Swafford and Whitwell soils are mainly in slight depressions or at the edge of this map unit. Also included are small, random areas of cobbly soils that contain more cobbles than the Sequatchie soil but less than Cobstone soils.

Sequatchie Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for row crops, including both field and horticultural crops. In a few areas it is in woodland. The rest is used for pasture and hay.

This soil is well suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Proper

stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is high for yellow-poplar, upland oaks, black walnut, and loblolly pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed.

This soil is well suited to most urban uses. Proper engineering design and construction can easily overcome most limitations.

The capability subclass is IIe.

Sn—Sewanee loam, occasionally flooded

This is a deep, moderately well drained, nearly level soil. It is on narrow flood plains on the Cumberland Plateau. Slopes are 0 to 2 percent. The mapped areas are elongated in shape and range from 5 to 25 acres in size.

Typical Profile

Surface layer:
0 to 7 inches, dark brown and brown loam

Subsoil:
7 to 17 inches, yellowish brown loam
17 to 39 inches, pale brown loam that has mottles in shades of gray

Substratum:
39 to 60 inches, light brownish gray sandy loam

Included with this soil in mapping are small areas of Bonair soils mainly in slight depressions. Also included are small, random areas of well drained soils.

Sewanee Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to more than 60 inches
High water table: 1 to 2 feet; December-March
Flooding: Occasional; very brief; December-March

Most of this soil is in woodland. In most areas it is in narrow strips in large, wooded tracts. Some areas of the soil are remote and difficult to access.

This soil is well suited to row crops, but some areas are small and elongated. Water-tolerant plants that are plantable in late spring are best suited. The soil has no other significant limitation for row crops. It is well suited to hay and pasture. Most grasses and legumes are suited. Plants sensitive to wetness, such as alfalfa, are poorly suited. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is well suited to woodland use. Productivity is high for yellow-poplar, eastern white pine, and sweetgum. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Using conventional wheeled or tracked equipment when the soil is wet causes rutting and compaction. Using low-pressure ground equipment reduces damage to the soil and helps to maintain productivity.

This soil is not suited to most urban uses because of flooding. Wetness is also a limitation for many uses.

The capability subclass is IIw.

Su—Sullivan loam, occasionally flooded

This is a very deep, well drained, nearly level soil. It is on bottom lands along the Sequatchie River and along tributary streams in the Sequatchie Valley. Slopes are 0 to 2 percent. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, dark brown loam

Subsoil:
9 to 21 inches, dark brown loam
21 to 31 inches, dark yellowish brown fine sandy loam

Substratum:
31 to 68 inches, dark yellowish brown fine sandy loam

Included with this soil in mapping are small areas of Hamblen and Sequatchie soils. Hamblen soils are mainly in slight depressions. Sequatchie soils are on low terraces in the upper part of this map unit. Also included are a few areas of soils that have a dark surface layer as much as 20 inches thick.

Sullivan Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid to neutral
Depth to bedrock: More than 60 inches
High water table: 4 to 6 feet; December-March
Flooding: Occasional; very brief; December-March

In most areas this soil is used for pasture because many areas are narrow strips not suited to crops. The rest is used mostly for row crops.

This soil is well suited to row crops but many areas are small and elongated. Flooding is a hazard, but

annual crops are seldom damaged. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition. Periodic mowing and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is high for yellow-poplar, black walnut, and loblolly pine. Because undesirable plants prevent adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. There are no other significant limitations to woodland use and management.

This soil is poorly suited to most urban uses because of flooding. It is unsuited to use as sites for buildings.

The capability subclass is IIw.

Sw—Swafford loam, 0 to 3 percent slopes

This is a very deep, moderately well drained, nearly level soil. It is on terraces in the Sequatchie Valley. The mapped areas are elongated or irregular in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, brown loam

Subsoil:
9 to 22 inches, yellowish brown loam
22 to 46 inches, yellowish brown loam that has gray and brown mottles; brittle and firm
46 to 65 inches, strong brown loam that has gray and brown mottles; brittle and firm

Included with this soil in mapping are small areas of Holston and Whitwell soils. Holston soils are mainly in the upper part of this map unit. Whitwell soils are mainly on toe slopes and in slight depressions in the lower part of this map unit.

Swafford Soil Properties and Features

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid
Depth to bedrock: More than 60 inches
High water table: Perched; 2 to 3 feet; December-March
Flooding: None

In most areas this soil is used for row crops, hay, or pasture. In a few areas it is in woodland.

This soil is well suited to row crops, pasture, and hay. Most crops and grasses and legumes are suited. Plants sensitive to wetness, such as alfalfa, are only moderately suited. Erosion is not a problem. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition. Periodic mowing and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar and upland oaks. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed.

This soil is moderately suited to many urban uses. Wetness and low strength are limitations for some uses. Septic tank absorption fields are poorly suited because of wetness and moderately slow permeability.

The capability subclass is IIw.

TaC—Tasso loam, 5 to 12 percent slopes

This is a very deep, moderately well drained, sloping soil. It is on foot slopes in the Sequatchie Valley. The mapped areas are elongated in shape and range from 5 to 30 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, dark grayish brown and brown loam

Subsoil:
5 to 21 inches, yellowish brown loam
21 to 31 inches, yellowish brown gravelly clay loam; firm and brittle
31 to 66 inches, yellowish red gravelly clay loam

Included with this soil in mapping are small areas of Barger, Bodine, Minvale, and Pailo soils. Barger and Minvale soils are in randomly scattered areas in this map unit. Bodine and Pailo soils are mainly on convex side slopes in the upper part of this map unit.

Tasso Soil Properties and Features

Permeability: Moderately slow
Available water capacity: Moderate to high
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland or pasture. In a few areas it is used for row crops.

This soil is moderately suited to row crops. Erosion

is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar and upland oaks. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. Such methods include chopping, burning, and herbicide application.

This soil is moderately suited to most urban uses. Steepness of slope is a limitation for many urban uses. During wet periods septic tank absorption fields do not function properly because of moderately slow permeability. Good engineering design and construction practices can overcome most limitations. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling.

The capability subclass is IIIe.

WaB—Waynesboro loam, 2 to 6 percent slopes

This is a very deep, well drained, undulating soil. It is on ridgetops in the Sequatchie Valley. The mapped areas are irregular or oval in shape and range from 5 to 75 acres in size.

Typical Profile

Surface layer:
0 to 8 inches, dark brown loam

Subsoil:
8 to 14 inches, brown loam
14 to 22 inches, red clay loam
22 to 70 inches, dark red clay

Included with this soil in mapping are small areas of Etowah and Holston soils. Etowah soils are on foot slopes. Holston soils are in randomly scattered areas in this map unit.

Waynesboro Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for row crops. A small acreage is woodland. The rest is used for pasture and hay.

This soil is well suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on or near the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to reduce erosion and to control runoff. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited to many urban uses. Low strength and the clay content of the subsoil are limitations for some urban uses. Good engineering design and construction practices on this soil include reinforcement of foundations and proper compaction of fills. They can overcome most limitations.

The capability subclass is IIe.

WaC2—Waynesboro loam, 6 to 12 percent slopes, eroded

This is a very deep, well drained, rolling soil. It is on ridges and side slopes in the Sequatchie Valley. Erosion has removed part of the original surface layer. The mapped areas are irregular or elongated in shape and range from 5 to 75 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, reddish brown loam

Subsoil:
9 to 16 inches, yellowish red clay loam
16 to 65 inches, red and dark red clay

Included with this soil in mapping are small areas of Etowah and Holston soils. Etowah soils are on foot slopes. Holston soils are in randomly scattered areas in this map unit.

Waynesboro Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid

Figure 10.—Waynesboro loam, 6 to 12 percent slopes, eroded, is well suited to forage production.

Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

The largest acreage of this soil is used for pasture and hay (fig. 10). A few areas are in woodland. The rest is used for row crops.

This soil is moderately suited to row crops. Erosion is a hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application.

This soil is well suited or moderately suited to most urban uses. Steepness of slope is a moderate limitation for most uses. Low strength and the clay content of the subsoil are also limitations for some uses. Good engineering design and construction practices can generally overcome the limitations.

The capability subclass is IIIe.

WaD2—Waynesboro loam, 12 to 20 percent slopes, eroded

This is a very deep, well drained, hilly soil. It is on convex side slopes in the Sequatchie Valley. Erosion has removed part of the original surface layer. The mapped areas are elongated in shape and range from 5 to 30 acres in size.

Typical Profile

Surface layer:
0 to 7 inches, brown loam

Subsoil:
7 to 14 inches, red clay loam
14 to 65 inches, dark red clay

Included with this soil in mapping are small areas of Braxton, Etowah, Holston, and Talbott soils. Braxton and Talbott are on nose slopes. Etowah and Holston soils are mainly on foot slopes.

Waynesboro Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

High water table: More than 6 feet
Flooding: None

In most areas this soil is used for pasture and hay. The rest is used for row crops.

This soil is poorly suited to row crops. Erosion is a severe hazard if row crops are grown. Conservation tillage systems that leave crop residue on the surface, contour farming, winter cover crops, grassed waterways, and crop rotations help to control erosion and to reduce runoff. This soil is moderately suited to pasture and hay. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation is needed. It includes chopping, burning, and herbicide application. Erosion is a moderate hazard during timber harvest. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is poorly suited to many urban uses because of the moderately steep slope. Low strength and the clay content of the subsoil are also limitations for some uses. In some areas planning and designing facilities to fit the landscape can reduce or overcome slope.

The capability subclass is IVe.

WaD3—Waynesboro clay loam, 12 to 25 percent slopes, severely eroded

This is a very deep, well drained, hilly soil. It is on side slopes in the Sequatchie Valley. Erosion has removed most of the original surface layer. In places gullies are as much as 3 feet deep and 10 feet wide. The mapped areas are elongated in shape and range from 5 to 40 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, reddish brown clay loam

Subsoil:
5 to 60 inches, red clay

Included with this soil in mapping are small areas of Braxton, Etowah, Holston, and Talbott soils. Braxton and Talbott soils are near the edge of this map unit in the upper part and on nose slopes. Etowah and Holston soils are mainly on concave foot slopes and along drainageways.

Waynesboro Soil Properties and Features

Permeability: Moderate
Available water capacity: Moderate to high
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is used for pasture. The rest has reverted to woodland.

This soil is poorly suited to row crops. Erosion is a severe hazard if row crops are grown. The poor workability of the severely eroded surface layer is also a limitation. This soil is moderately suited to pasture. When established, most grasses and legumes are suited. Seedbeds are difficult to prepare except under ideal moisture conditions. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is moderately suited to woodland use. Productivity is moderate for loblolly pine, shortleaf pine, and Virginia pine. Special site preparation, such as harrowing and bedding, helps to establish seedlings, to reduce seedling mortality, and to increase early seedling growth. The main limitations are the clay content in the upper part of the soil and steepness of slope. Controlling erosion requires careful use of equipment and a layout of roads and skid trails that preserves the duff layer.

This soil is poorly suited to many urban uses because of steepness of slope. Designing structures and facilities to fit the natural landscape helps to overcome slope and reduces cutting and filling. For some uses low strength and the clay content in the surface layer and in the subsoil are also limitations.

The capability subclass is VIe.

WaE2—Waynesboro loam, 20 to 30 percent slopes, eroded

This is a very deep, well drained, steep soil. It is on convex side slopes in the Sequatchie Valley. Erosion has removed part of the original surface layer. The mapped areas are elongated in shape and range from 5 to 40 acres in size.

Typical Profile

Surface layer:
0 to 5 inches, brown loam

Subsoil:
5 to 13 inches, red clay loam
13 to 65 inches, dark red clay

Included with this soil in mapping are small areas of Allen, Etowah, Holston, and Talbott soils. Allen soils are in randomly scattered areas in this map unit. Etowah and Holston soils are mainly on foot slopes in the lower part of this map unit. Talbott soils are on nose slopes.

Waynesboro Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: More than 6 feet
Flooding: None

In most areas this soil is in woodland or used for pasture.

This soil is not suited to row crops because of the steep slopes and the very severe erosion hazard. This soil is moderately suited to pasture. Most grasses and legumes are suited. Proper stocking rates, fertilization, and periodic mowing and clipping help to keep the pasture in good condition and to control erosion.

This soil is moderately suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, shortleaf pine, and Virginia pine. Because undesirable plants reduce adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. The main limitation is steepness of slope. Cable yarding harvesting systems are safer, reduce damage to the soil, and help to maintain productivity. Planting and harvesting on the contour help to control erosion.

This soil is poorly suited to most urban uses because steep slopes are a severe limitation. This limitation is difficult to overcome for most uses. For some uses the clayey subsoil and low strength are also limitations.

The capability subclass is VIe.

Wh—Whitwell loam, rarely flooded

This is a very deep, moderately well drained, nearly level soil. It is on low stream terraces in the Sequatchie Valley. Slopes are 0 to 2 percent. The mapped areas are elongated in shape and range from 5 to 100 acres in size.

Typical Profile

Surface layer:
0 to 9 inches, brown loam

Subsoil:
9 to 14 inches, yellowish brown loam
14 to 24 inches, yellowish brown loam
24 to 40 inches, yellowish brown clay loam that has mottles in shades of gray

Substratum:
40 to 70 inches, light brownish gray loam

Included with this soil in mapping are small areas of Hamblen, Newark, Swafford, and Sequatchie soils. Hamblen soils are in drainageways. Newark soils are in slight depressions. Swafford soils are mainly on foot slopes in the upper part of this map unit. Sequatchie soils are in the upper part on this map unit. Also included, on low terraces predominantly along Rogers Branch and McWilliams Creek in the eastern part of the Sequatchie Valley, are small areas of soils that contain more clay than the Whitwell soil in the surface layer and in the subsoil.

Whitwell Soil Properties and Features

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches
High water table: 2 to 3 feet; December-March
Flooding: Rare

In most areas this soil is used for row crops, hay, or pasture. In a few areas it is in woodland.

This soil is well suited to row crops. Crops sensitive to wetness are only moderately suited. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Alfalfa is poorly suited because of wetness. Proper stocking rates, fertilization, and restricted grazing during wet periods help to keep the pasture in good condition. Periodic mowing and clipping help to maintain uniform growth and to discourage selective grazing.

This soil is well suited to woodland use. Productivity is moderately high for yellow-poplar, upland oaks, loblolly pine, and eastern white pine. Because undesirable plants prevent adequate natural or artificial reforestation, intensive site preparation and maintenance are needed. Special site preparation, such as harrowing, herbicide application, and bedding, help to establish seedlings, to reduce seedling mortality, and to increase early seedling growth.

This soil is poorly suited to most urban uses because of flooding and wetness. These limitations are difficult to overcome.

The capability subclass is IIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 22,087 acres in the survey area, or nearly 13 percent of the total acreage, meets the soil requirements for prime farmland. About 12,500 acres are in the Sequatchie Valley and the rest is on the Cumberland Plateau.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed at the end of this section. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

The map units that meet the requirements for prime farmland are:

BbB	Beersheba loam, 2 to 6 percent slopes
Br	Bonair loam, occasionally flooded (where drained)
CaB	Capshaw silt loam, 2 to 5 percent slopes
EtB	Etowah silt loam, 2 to 5 percent slopes
Ha	Hamblen loam, occasionally flooded
HoB	Holston loam, 2 to 5 percent slopes
LaB	Lily loam, 2 to 6 percent slopes
LoB	Lonewood silt loam, 2 to 5 percent slopes
Mn	Melvin and Newark silt loams, depressional (where drained)
SaA	Sequatchie loam, 0 to 2 percent slopes
SeA	Sequatchie loam, 0 to 2 percent slopes, rarely flooded
SeB	Sequatchie loam, 2 to 6 percent slopes
Sn	Sewanee loam, occasionally flooded
Su	Sullivan loam, occasionally flooded
Sw	Swafford loam, 0 to 3 percent slopes
WaB	Waynesboro loam, 2 to 6 percent slopes
Wh	Whitwell loam, rarely flooded

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

This section suggests general management needed for crops and pasture in the survey area. It lists for each soil the estimated yields of the main crops and pasture plants. It explains the system of land capability classification of the Natural Resources Conservation Service.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

About 5,400 acres of harvested crops and 23,400 acres of pasture are in Sequatchie County, according to the 1987 U.S. Census of Agriculture. Soybeans and corn are the most commonly grown row crops. However, vegetable crops are important in a few areas in the Sequatchie Valley and on the Cumberland Plateau. Most pastures consist of mixed tall fescue and white clover.

Many soils in Sequatchie County are suited to the commonly grown crops. Some soils, such as Colbert and Talbott soils, have a heavy clay subsoil immediately below the surface layer. These soils are poorly suited to most commercial vegetable crops. For the highest level of yields, fertilizer is needed on all soils in Sequatchie County and lime is needed on many soils. The amounts needed depend on the pH level and on the amount of plant nutrients in the soil as determined by soil tests, the needs of the crop, and the level of yield desired. The Cooperative Extension Service operates a soil testing laboratory for landowners and operators. It also makes recommendations on amounts of fertilizer and lime needed.

Most of the soils in Sequatchie County are relatively low in content of organic matter. The organic matter present is mostly in the surface layer. It is an important source of nitrogen for crops. It also increases water infiltration and available moisture capacity, improves soil structure, reduces surface crusting, and promotes good tilth. Building up a high level of organic matter is not feasible, but maintaining the present level by returning organic material to the soil is important. Some management practices add organic material to the soil. These include applying farm manure, leaving

or returning plant residue on the soil, growing sod crops, and incorporating cover crops or other green manure crops into the soil.

All gently sloping and steeper, cultivated soils are subject to erosion. Erosion reduces soil productivity. If the surface layer is lost through erosion, most of the available plant nutrients and the organic matter are also lost. Erosion is especially damaging on soils where clay is exposed on the surface, on Colbert and other soils where the loamy surface layer is removed, or on Lily soils, which are moderately deep over bedrock. On farmland soil erosion can result in sediment, nutrients, and pesticides entering and thus polluting streams. Water pollution occurs when soil particles attached to nutrients and pesticides reach streams. Controlling erosion minimizes water pollution and helps to maintain or improve water quality.

A cropping system that keeps plant cover on the soil for extended periods helps to control erosion and to preserve soil productivity. Grass and legume forage crops included in the cropping system help to control erosion on sloping land, provide nitrogen to plants, and improve soil tilth for the following crop. If properly inoculated, legumes can utilize nitrogen from the air.

On cropland, conservation practices are needed that help to control erosion. These practices include no-till or reduced till, terraces, diversions, contour farming, and stripcropping. They also include using cropping systems that rotate grass, legumes, and close-growing crops with row crops.

Terraces and diversions reduce the length of slope, conduct runoff to stabilized outlets, and thus help to control erosion. They are most practical on deep, well drained soils that have smooth uniform, slopes. Etowah and Sequatchie soils are examples. Stripcropping and contour farming are also best suited to soils that have uniform slopes.

Maintaining pasture helps to control erosion on most soils. A high level of pasture management includes applying lime and fertilizer, regulating grazing, using adapted plants in the pasture mixture, and clipping to control weeds and brush. Controlled grazing, where livestock is rotated between pastures, allows pasture plants a period of growth.

One or more management systems can be equally effective in controlling erosion and in producing good yields on specific fields or farms. Hence, landowners or operators normally have alternatives. The local representative of the Natural Resources Conservation Service can provide assistance in planning an effective management system.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a

substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. These soils have not been described in Sequatchie County.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w,* or *s,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 4. The capability classification of the map units in this survey area is given in the section "Detailed Soil Map Units" and in table 5, "Land Capability Classes and Yields per Acre of Crops and Pasture."

Woodland Management and Productivity

Woodland takes in about 79 percent of Sequatchie County. Most woodland is in private ownership, but timber companies own a few large tracts. White oak-red oak is the most common forest type and is generally found on uplands. The loblolly-shortleaf pine type grows throughout the county; it commonly is planted for pulpwood production and in eroded areas (fig. 11). The oak-pine type covers on the rest; typically, it grows on dry ridges and on steep, south- and west-facing slopes.

In Sequatchie County average woodland growth is about 36 cubic feet per acre per year. But, the potential average growth for this area is 66 cubic feet per acre per year. The greatest growth potential is generally on the lower third of north- and east-facing slopes, where growth can reach 120 cubic feet per acre per year. Other woodland values include wildlife habitat, recreation, natural beauty, and watershed protection.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed.

In the table, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict

equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species.

Figure 11.—Large areas on the Cumberland Plateau are planted to loblolly pine and other pines for pulpwood. The soil is Lily loam, 2 to 6 percent slopes.

Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. It indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand. Volume is expressed as cubic feet per acre per year. It can be converted to board feet by multiplying by a factor of about 5. For example, a volume of 114 means the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 570 board feet per acre per year.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil.

Trees to plant are those that are suitable for commercial wood production.

Recreation

Sequatchie County has potential for a wide variety of recreation activities. Vacation cabins; camping grounds; big game hunting; and natural, scenic, and historic areas have high development potential. Vacation farms, shooting preserves, small game hunting, warm water fishing, cold water fishing, water sports areas, picnicking, field sport areas, and riding stables have medium development potential. Golf courses have low development potential.

The soils in Sequatchie County generally have fair characteristics for recreation activities. Soil depth, permeability, texture, slope, surface stones, and drainage are important soil properties in developing recreation enterprises. Most soil properties that are problems can be overcome with careful site selection and planning.

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In the table, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in the table can be supplemented by other information in this soil survey. For example, interpretations for dwellings without basements and for local roads and streets are given in table 9. Interpretations for septic tank absorption fields are given in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand

intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Michael E. Zeman, state biologist, Natural Resources Conservation Service, helped to prepare this section.

Wildlife is an important natural resource in the county. It can provide income from sport hunting, recreational photography, and bird watching. Bobwhite quail, cottontail rabbit, whitetailed deer, ruffed grouse, eastern wild turkey, and gray and fox squirrels are popular game species.

Whitetailed deer is the most popular game animal in the county. The deer population is low or moderate, but the herd has grown by substantial numbers in recent years. Deer harvest records indicate more than a twelve-fold increase in the deer population from 1970 to 1990. A few eastern wild turkeys lived in the county in the 1950's. The Tennessee Wildlife Resources Agency (TWRA) has restored additional nucleus flocks. Through both stocking and habitat management the wild turkey population has shown considerable growth. The bobwhite quail population is low in the county because of low quality habitat in the extensive forested and mountainous region. However, this habitat type is of high quality for the ruffed grouse. The TWRA considers the ruffed grouse population high throughout the county. The cottontail rabbit population is low because of poor quality, primarily woodland habitat. Three species of squirrels inhabit the county: southern flying squirrel, fox squirrel, and gray squirrel. Gray squirrel, the most common species, has good to excellent numbers throughout hardwood forests.

Southern flying squirrel is secretive and primarily nocturnal. It inhabits, in moderate numbers, hardwood forests. The fox squirrel population is low. Its common habitats include woodland edges and woody fence rows near open lands.

The waterfowl population is low in the county. Wood duck, mallard, and blue winged teal are the most common species migrating through the county. These species primarily utilize upland farm ponds, slack water areas of the Sequatchie River, and the riverine wetlands of the Sequatchie Valley.

Several species of furbearers inhabit the county. Wetland furbearers include mink, muskrat, and beaver. Their populations are low or moderate along streams, small lakes, and farm ponds. Upland furbearers are both common and abundant throughout the county. They include bobcat, opossum, raccoon, gray fox, striped skunk, and coyote. Many nongame species are abundant throughout the county. Various songbirds, both resident and migratory, are associated with different plant communities. Woodland birds include Carolina chickadee, tufted titmouse, pileated woodpecker, and warblers. Openland songbirds include robins, meadowlarks, and various sparrows. Common birds of prey include red-tailed hawk, sparrow hawk, barred owl, and screech owl. Common reptiles and amphibians include eastern box turtle, skinks, eastern hognose and copperhead snakes, bullfrogs, and dusky salamanders. Common mammals include Hispid cotton rat, moles, and other small rodents. The relative abundance of nongame species depends on the type and quality of habitat available to the species.

State and Federal lists of threatened or endangered wildlife that occurs in the county include gray bat, fine-rayed pigtoe pearly mussel, onyx rocksnail, river otter, and eastern cougar. Migratory species include bald eagle, peregrine falcon, osprey, sharp-shinned hawk, Cooper's hawk, and grasshopper sparrow.

Only a few soil types are suitable for impounding water, but the county has several ponds. Ramsey, Sequatchie, and Bouldin soils, for example, are limited for pond building because of seepage, slope, or depth to rock. Etowah and Lonewood soils, for example, have moderate limitations for pond building. Most ponds are stocked for recreation fishing with largemouth bass, bluegill, and channel catfish. The water quality in ponds, typically acidic, limits fish production.

Sequatchie County has a total of 104 miles of perennial warm water streams. These streams provide about 343 acres of aquatic habitat. Common fish species in streams include largemouth bass, rock bass, bluegill, green sunfish, channel catfish,

bullheads, and several species of darters and minnows. Most streams in the county are only moderately productive and have fair populations of warm water fishes. Some streams are nonproductive and essentially sterile because of acid mine drainage from abandoned coal mines.

No commercial warmwater or coldwater aquaculture is present in the county. Overall, most soils and the steep topography render the area unsuitable for extensive pond construction. The commercial aquaculture with the highest potential may be in the production of rainbow trout. The Highland Rim aquifer crops out in the Sequatchie Valley. Springs yielding an adequate volume of cold water could support trout.

A few acres of natural wetlands are in Sequatchie County, excluding artificial wetlands such as upland ponds. Wetlands are mainly on wooded bottom lands on Bonair and Melvin soils along streams and on flood plains of the Sequatchie River.

Bottom land hardwoods provide some of the most productive wildlife habitat in the county. They improve the water quality of streams. They remove nutrients and trap sediment from upland runoff. With their shade they lower water temperatures in streams. And, they provide leaf litter, which serves as food for aquatic insects.

Conservation practices can improve or provide quality wildlife habitat. On cropland, planned crop rotations and crop residue use can provide food and needed winter cover for many wildlife species. On pasture, deferred grazing and fencing protect food plots and nesting cover. These practices even protect streams and thus fish habitat. Field borders and filter strips along streams can protect water quality. They provide food, cover, and travel lanes for many wildlife species. Selective thinning of woodlands can protect den trees and quality mast-producing trees.

Other management practices can improve wildlife habitat. They include: wildlife upland habitat management, wildlife wetland habitat management, fishpond management, pasture and hayland management, livestock exclusion, and woodland improvement.

Some practices harm wildlife. They most often include indiscriminate burning, use of chemicals, and heavy grazing. They also include complete, clean mowing early in the growing (nesting) season. Finally, they include clean fall plowing, extensive clear cutting of timber, draining wetlands, and removing den and all mast-producing trees.

Technical assistance in the planning or application of wildlife conservation practices can be obtained from the Natural Resources Conservation Service, the University of Tennessee Agricultural Extension Service, the Tennessee Wildlife Resources Agency, and the Tennessee Division of Forestry.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

Elements of Wildlife Habitat

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, sorghum, and millet.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture

are also considerations. Examples of grasses and legumes are fescue, lovegrass, orchardgrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, sunflower, and aster.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are plum, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, arrowhead, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

Habitat for Various Kinds of Wildlife

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and coyote.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed

cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrink-swell potential can cause the movement of footings. A high water table, depth to bedrock, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 10 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or

maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, and large stones.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, and soil reaction affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally

preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

USDA Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3

inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on the basis of measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, 6 to 9 percent; and *very high*, more than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a

saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table—that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA 1975). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. Melvin Series is a fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA 1975) and in "Keys to Soil Taxonomy" (USDA 1992). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allen Series

The Allen series consists of very deep, well drained soils that have moderate permeability. These soils formed in loamy colluvium. They are on foot slopes and toe slopes at the base of the Cumberland Plateau Escarpment in the Sequatchie Valley. Slopes are 5 to 30 percent.

Typical pedon of Allen loam, 20 to 30 percent slopes; north of Dunlap, 1.0 mile west on Highway 8 from intersection with Highway 127, about 0.4 mile north on Old Union Road to Mansfield Cemetery, 250 feet west of road, 100 feet north of cemetery; (atlas sheet 8):

Oi—1 inch to 0; partly decomposed leaf litter.
A—0 to 3 inches; dark brown (10YR 3/3) loam; moderate fine granular structure; very friable; many fine, medium, and coarse roots; many fine and medium pores; strongly acid; clear smooth boundary.
BE—3 to 15 inches; strong brown (7.5YR 5/6) loam; moderate fine subangular blocky structure; very friable; common fine and medium and few coarse roots; many fine and medium pores; strongly acid; gradual smooth boundary.
Bt1—15 to 26 inches; yellowish red (5YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine and medium roots; many fine and medium pores; few faint clay films; very strongly acid; gradual wavy boundary.
Bt2—26 to 32 inches; yellowish red (5YR 4/6) clay loam; common fine distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine pores; common faint clay films; 2 percent fragments of sandstone up to 3 inches across; very strongly acid; clear smooth boundary.
Bt3—32 to 72 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine pores; common distinct clay films; 5 percent fragments of sandstone up to 6 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Fragments of mostly sandstone range from 0 to 15 percent throughout the solum. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E horizon and the Ap horizon, where it occurs, have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. These horizons are fine sandy loam or sandy loam, but in most pedons they are loam.

In most pedons a horizon separates the A and Bt horizons. It is transitional in color and texture. The Bt horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 6 or 8. It is loam, but in most pedons it is clay loam.

Barger Series

The Barger series consists of very deep, moderately well drained soils that have slow permeability. These soils formed in a loamy mantle and in the underlying loamy paleosol, which is high in chert content. They have a fragipan at a depth of about 19 inches (fig. 12). They are on ridgetops in the Sequatchie Valley. Slopes are 6 to 12 percent.

Typical pedon of Barger silt loam, 6 to 12 percent slopes; south of Dunlap, 0.6 mile east on John Burch Road from the intersection with Highway 28, about 0.5 mile south on Hudlow Loop Road, 0.3 mile west on a road, 150 feet southwest of road; (atlas sheet 13):

Oi—1 inch to 0; partly decomposed and undecomposed leaves and twigs.
A—0 to 1 inch; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; very friable; many fine and medium roots; many fine and medium pores; 10 percent angular fragments of chert up to 1 inch across; strongly acid; abrupt smooth boundary.
E—1 to 5 inches; brown (10YR 5/3) silt loam; weak fine granular structure; very friable; many fine and medium and common coarse roots; many fine and medium pores; 5 percent subangular fragments of chert up to 1 inch across; strongly acid; clear smooth boundary.
EB—5 to 11 inches; light yellowish brown (10YR 6/4) loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and medium pores; 5 percent rounded fragments of chert up to 1 inch across; strongly acid; gradual smooth boundary.
Bt—11 to 19 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and medium pores; few faint clay films; 15 percent rounded fragments of chert up to 1 inch across; very strongly acid; clear wavy boundary.
2Bx/E—19 to 23 inches; brownish yellow (10YR 6/6) very gravelly loam (B part); pockets of very pale brown (10YR 7/3) very gravelly loam (E part); weak coarse prismatic structure; very firm; compact; few faint clay films; 55 percent angular fragments of chert up to 1 inch across; 40 to 60 percent brittle, by volume; very strongly acid; clear wavy boundary.
2Bx1—23 to 38 inches; light yellowish brown (10YR 6/4) extremely gravelly loam; many fine distinct light gray (10YR 7/2) and few fine faint brownish

yellow (10YR 6/6) mottles; weak very coarse prismatic structure; extremely firm; 65 percent angular fragments of chert up to 3 inches across; weakly cemented; more than 60 percent brittle, by volume; very strongly acid; gradual smooth boundary.

2Bx2—38 to 63 inches; brownish yellow (10YR 6/6) very gravelly loam; common fine distinct light gray (10YR 7/2) and few fine distinct yellowish red (5YR 5/8) mottles; weak very coarse prismatic structure; extremely firm; 50 percent angular fragments of chert up to 5 inches across; weakly cemented; more than 60 percent brittle, by volume; very strongly acid.

Depth to bedrock is more than 60 inches. Depth to the fragipan ranges between 18 and 30 inches. Rounded fragments of chert up to 1 inch across range from 5 to 15 percent in the horizons above the fragipan. Angular fragments of chert up to 5 inches across range from 40 to 70 percent in the fragipan. These soils are very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E and Ap horizons, where they occur, have hue of 10YR, value of 4 to 6, and chroma of 3 to 6. These horizons are loam or silt loam.

In some pedons a horizon that is transitional in color and texture separates the E and B horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma 6 or 8. It is loam or silt loam.

The 2Bx horizon has hue of 10YR or 7.5YR and, in the lower part, 5YR; value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of gray, brown, and red. In some pedons it has mottles without a dominant matrix color in the lower part. In the fine earth fraction it is loam or clay loam. The E part between polygons has hue of 10YR, value of 6 or 7, and chroma of 1 to 3. In the fine earth fraction it is loam or silt loam. In some pedons it lacks an observable structure, and is massive.

Beersheba Series

The Beersheba series consists of moderately deep, well drained soils that have moderately rapid permeability. These soils formed in loamy residuum derived from sandstone formations. They are on ridgetops and side slopes on the Cumberland Plateau. Slopes are 2 to 12 percent.

Typical pedon of Beersheba loam, 6 to 12 percent slopes; 10.7 miles north on State Highway 8 from the intersection with State Highway 127 at Dunlap, 1.2 miles east on White Oak Swamps Road, 750 feet north on road, 150 feet east of road; (atlas sheet 3):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 1 inch; dark brown (10YR 3/3) loam; moderate fine granular structure; very friable; many fine and medium roots; many very fine and fine pores; very strongly acid; abrupt smooth boundary.

E—1 to 4 inches; brown (10YR 5/3) loam; moderate medium granular structure; very friable; common fine and medium roots; many very fine and fine pores; very strongly acid; clear smooth boundary.

BE—4 to 9 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine and medium roots; common very fine and fine pores; strongly acid; gradual smooth boundary.

Bt1—9 to 20 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; common very fine and fine pores; few faint clay films; very strongly acid; gradual smooth boundary.

Bt2—20 to 30 inches; yellowish brown (10YR 5/8) clay loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; common very fine and fine pores; common faint clay films; 2 percent fragments of sandstone up to 2 inches across; very strongly acid.

BC—30 to 33 inches; yellowish brown (10YR 5/8) clay loam interspersed with yellow (10YR 7/6) sandy loam that has evidence of rock structure; weak fine subangular blocky structure in some parts, massive in others; friable; few fine and coarse roots; few fine pores; 5 percent fragments of soft sandstone; very strongly acid.

Cr—33 to 45 inches; strong brown (7.5YR 5/8), yellow (10YR 7/6), and red (2.5YR 4/8) soft weathered sandstone.

Depth to soft sandstone ranges from about 20 to 40 inches. Depth to hard sandstone generally ranges from 40 to 60 inches. Fragments of both soft and hard sandstone range from 0 to 15 percent in the solum and up to 35 percent in the C horizon. These soils are extremely acid to strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 1 to 3. The Ap horizon, where it occurs, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. In most pedons it is loam, but it ranges to fine sandy loam and silt loam.

In some pedons a horizon that is transitional in color and texture is between the E and B horizons. The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy clay loam,

or clay loam. In some pedons it has mottles in shades of brown, red, or yellow.

The BC horizon or C horizon, where it occurs, has hue of 10YR, 7.5YR, or 5YR, value of 5 or 6, and chroma of 4 to 8. It is loam or sandy loam.

Bethesda Series

The Bethesda series consists of very deep, well drained soils that have moderately slow permeability. These soils formed in mixed soil and rock material that have been drastically disturbed by human activities. They are in spoil piles of surface coal mines on the Cumberland Plateau. In some areas they have been smoothed and in others they remain the same as after open surface mining. Slopes are 8 to 90 percent.

Typical pedon of Bethesda very channery loam, in an area of Bethesda-Pits complex, 20 to 90 percent slopes; 2.5 miles west on Highway 399 from intersection with Highway 8 at Cagle, 3.1 miles north on Cherry Branch Road, 1,600 feet west of road; (atlas sheet 4):

Ap—0 to 2 inches; dark brown (10YR 4/3) very channery loam; massive; friable; few fine and medium roots; 40 percent fragments of shale and sandstone up to 3 inches across; very strongly acid; abrupt smooth boundary.

C1—2 to 30 inches; yellowish brown (10YR 5/4) extremely channery silty clay loam; common fine distinct yellowish brown (10YR 5/8) and common fine faint pale brown (10YR 6/3) mottles; massive; friable; few fine and medium roots; 75 percent fragments of shale and sandstone up to 6 inches across; very strongly acid; abrupt wavy boundary.

C2—30 to 70 inches; light yellowish brown (2.5Y 6/4) extremely channery clay loam; common fine prominent yellowish brown (10YR 5/8), common fine faint light brownish gray (2.5Y 6/2), and few fine prominent very dark gray (N 3/0) mottles; massive; firm; 80 percent fragments of shale, coal, and sandstone up to 8 inches across; very strongly acid.

Depth to bedrock is more than 60 inches, except on highwalls where rock outcrops are common. Fragments of shale, sandstone, and coal range from 25 to 50 percent in the A horizon and from 35 to 80 percent in the C horizon. They range to 6 feet across. These soils are extremely acid or very strongly acid, but where limed the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3, or it is mottled without a dominant matrix color. The fine earth fraction is loam or silt loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8, or it is mottled without a dominant matrix color. In the fine earth fraction it is loam, silt loam, silty clay loam, or clay loam.

Bodine Series

The Bodine series consists of very deep, somewhat excessively drained soils that have moderately rapid permeability. These soils formed in residuum derived from cherty limestone. They are on ridgetops and side slopes in the Sequatchie Valley. Slopes are 12 to 50 percent.

Typical pedon of Bodine gravelly loam, in an area of Bodine and Pailo gravelly loams, 20 to 50 percent slopes; 0.6 mile east on John Burch Road from the intersection with Highway 28, south of Dunlap, 0.5 mile south on Hudlow Loop Road, 0.1 mile west on road, 225 feet west of road; (atlas sheet 13):

Oi—1 inch to 0; partly decomposed and undecomposed leaf litter.

A—0 to 1 inch; dark grayish brown (10YR 4/2) gravelly loam; moderate fine granular structure; very friable; many fine and medium roots; many very fine and fine pores; 30 percent angular and subangular fragments of chert up to 1 inch across; very strongly acid.

E—1 to 6 inches; brown (10YR 5/3) gravelly loam; moderate fine and medium granular structure; very friable; many fine and medium and common coarse roots; many very fine and fine pores; 30 percent angular and subangular fragments of chert up to 2 inches across; very strongly acid; gradual smooth boundary.

BE—6 to 16 inches; light yellowish brown (10YR 6/4) gravelly loam; weak fine subangular blocky structure; friable; common fine, medium, and coarse roots; common very fine and fine pores; 35 percent angular fragments of chert up to 5 inches across; very strongly acid; gradual smooth boundary.

Bt1—16 to 24 inches; yellowish brown (10YR 5/6) very gravelly loam; moderate fine subangular blocky structure; friable; common fine and medium roots; common very fine and fine pores; few faint clay films; 55 percent angular fragments of chert up to 5 inches across; strongly acid; gradual smooth boundary.

Bt2—24 to 37 inches; yellowish brown (10YR 5/6) extremely gravelly loam; common fine very pale brown (10YR 7/4) mottles; moderate fine subangular blocky structure; friable; few fine and medium roots; common very fine and fine pores; few faint clay films; 65 percent angular fragments

of chert up to 5 inches across; very strongly acid; clear smooth boundary.

Bt3—37 to 65 inches; strong brown (7.5YR 5/6) extremely gravelly clay loam; pockets of red (2.5YR 4/8) and yellow (10YR 7/6) loam and sandy loam; moderate fine subangular blocky structure; friable; few fine and medium roots; common very fine and fine pores; few faint clay films; 65 percent angular fragments of chert up to 5 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Fragments of chert up to 5 or more inches across range from 20 to 40 percent in the A and E horizons and from 35 to 70 percent in the Bt horizons. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In the fine earth fraction it is loam, silt loam, or sandy loam.

In some pedons a horizon that is transitional in color and texture is between the E and B horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. In some pedons it has mottles in shades of brown, yellow, and red. In the fine earth fraction it is loam, silt loam, clay loam, or silty clay loam.

Bonair Series

The Bonair series consists of deep, poorly drained soils that have moderate permeability. These soils formed in alluvium derived from sandstone and shale. They are on flood plains on the Cumberland Plateau. Slopes are 0 to 2 percent.

Typical pedon of Bonair loam, occasionally flooded; 13.1 miles north on Highway 8 and Highway 111 from the intersection with Highway 127, about 150 feet west of Highway 111; (atlas sheet 1):

Oi—2 inches to 0; partly decomposed or decomposed leaves.

A—0 to 9 inches; very dark gray (10YR 3/1) loam; moderate fine granular structure; very friable; many fine and medium roots; many very fine and fine pores; very strongly acid; clear smooth boundary.

Bg—9 to 49 inches; light brownish gray (2.5Y 6/2) loam; common fine and medium prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine and medium roots; common very fine and fine pores; strongly acid; clear smooth boundary.

Cg—49 to 64 inches; light brownish gray (2.5Y 6/2) fine sandy loam; common medium prominent strong brown (7.5YR 5/6 mottles; massive; very friable; very strongly acid.

R—64 inches; sandstone.

Depth to bedrock, most commonly sandstone, ranges from 40 to 70 inches. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. It is loam or silt loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. In some pedons in the lower part the Bg horizon is mottled without a dominant matrix color. In most pedons it has mottles in shades of brown and gray. It is loam or silt loam.

The BC horizon, where it occurs, and the C horizon have hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or they are neutral. In some pedons they are mottled without a dominant matrix color. In most pedons they have mottles in shades of brown and gray. They are silt loam, loam, or fine sandy loam.

Bouldin Series

The Bouldin series consists of very deep, well drained soils that have moderately rapid permeability. These soils formed in colluvium derived from sandstone and contain many cobbles and stones (fig. 13). They are on the Cumberland Plateau Escarpment. Slopes are 20 to 75 percent.

Typical pedon of Bouldin stony loam, 20 to 75 percent slopes, bouldery; south of Dunlap, 1.9 miles on Highway 28 from the intersection with Highway 127, about 0.45 mile west on John Burch Road to Cookston Road, 1.0 mile south on Cookston Road to farm and mine road, 0.65 mile west on road, on south side of road; (atlas sheet 10):

Oi—1 inch to 0; partly decomposed leaf litter.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) stony loam; weak fine granular structure; very friable; many fine and medium roots; many fine pores; 25 percent fragments of sandstone up to 17 inches across; strongly acid; abrupt smooth boundary.

E—2 to 8 inches; brown (10YR 5/3) stony loam; weak medium granular structure; very friable; many fine and medium and common coarse roots; many fine pores; 20 percent fragments of sandstone up to 14 inches across; strongly acid; clear smooth boundary.

BE—8 to 20 inches; yellowish brown (10YR 5/6) cobbly loam; weak fine subangular blocky structure; very friable; common fine, medium, and

coarse roots; many fine pores; 30 percent fragments of sandstone up to 10 inches across; very strongly acid; gradual smooth boundary.

Bt1—20 to 36 inches; strong brown (7.5YR 5/6) very stony loam; moderate fine subangular blocky structure; friable; common fine, medium, and few coarse roots; common fine pores; few faint clay films; 40 percent fragments of sandstone up to 15 inches across; very strongly acid; gradual smooth boundary.

Bt2—36 to 70 inches; yellowish red (5YR 5/6) very stony clay loam; moderate fine subangular blocky structure; friable; common fine pores; few faint clay films; 45 percent fragments of sandstone up to 12 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Fragments of sandstone up to 4 feet or more across range from 15 to 35 percent in the A, E, and BE horizons and from 35 to 65 percent in the Bt horizon. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. In the fine earth fraction they are loam.

In most pedons a horizon that is transitional in color and texture lies between the E and Bt horizons. The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 or 8. In the fine earth fraction it is loam or clay loam.

Braxton Series

The Braxton series consists of very deep, well drained soils that have moderately slow permeability. These soils formed in residuum derived from limestone. They are on uplands of the Sequatchie Valley. Slopes range from 5 to 20 percent.

Typical pedon of Braxton silt loam, in an area of Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded; 2.1 miles east on Old York Road from Dunlap, 1,100 feet north of road, 40 feet west of fence; (atlas sheet 11):

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; friable; common very fine and fine roots; common very fine and fine pores; moderately acid; abrupt smooth boundary.

Bt1—7 to 12 inches; yellowish red (5YR 5/6) clay; strong fine angular and subangular blocky structure; friable; few very fine and fine roots; few very fine and fine pores; common distinct clay films; strongly acid; clear smooth boundary.

Bt2—12 to 34 inches; yellowish red (5YR 5/6) clay; common medium prominent brownish yellow (10YR 6/8) and few fine distinct red (2.5YR 4/8) mottles; strong fine and medium angular and subangular blocky structure; firm; few very fine and fine pores; many distinct clay films; strongly acid; gradual smooth boundary.

Bt3—34 to 45 inches; strong brown (7.5YR 5/8) clay; many medium distinct yellowish red (5YR 5/6) and few fine prominent pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; many distinct clay films; strongly acid; clear smooth boundary.

Bt4—45 to 67 inches; yellowish brown (10YR 5/6) clay; common fine distinct pale brown (10YR 6/3) and few fine prominent yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; firm; common distinct clay films; strongly acid.

Depth to limestone is more than 60 inches. Fragments of chert up to 1 inch across range from 0 to 10 percent in the upper horizons. These soils are strongly acid or moderately acid.

The A horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is silt loam or silty clay loam.

In the upper 30 to 40 inches, the Bt horizon has hue of 5YR, value of 5, and chroma of 6 or 8. In the lower part it has hue of 7.5YR or 10YR, value of 5, and chroma of 6 or 8. In some pedons in the upper part it has mottles in shades of brown and yellow. In the lower part it has few to many mottles in shades of brown, yellow, red, or gray. The horizon is clay or silty clay.

Capshaw Series

The Capshaw series consists of deep, moderately well drained soils that have slow permeability. These soils formed in a thin layer of alluvium and in the underlying clayey residuum. They are on terraces and uplands in the Sequatchie Valley. Slopes are 2 to 5 percent.

Typical pedon of Capshaw silt loam, 2 to 5 percent slopes; 2.2 miles east on Old York Road from Dunlap, 0.25 mile north on East Valley Road, 60 feet west of road; (atlas sheet 11):

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; few fine roots; common fine pores; moderately acid; abrupt smooth boundary.

Bt1—9 to 15 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; common fine

pores; common distinct clay films; few fine black accumulations; strongly acid; clear smooth boundary.

Bt2—15 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct pale brown (10YR 6/3) mottles; friable; few fine pores; common distinct clay films; 2 percent gravel up to 1 inch across; common fine black accumulations; strongly acid; clear smooth boundary.

Bt3—20 to 28 inches; yellowish brown (10YR 5/6) clay; common fine prominent light brownish gray (2.5Y 6/2) mottles; moderate fine subangular blocky structure; very firm; few fine pores; common distinct clay films; common fine black and brown accumulations; strongly acid; clear smooth boundary.

Bt4—28 to 52 inches; yellowish brown (10YR 5/4) clay; few fine prominent light brownish gray (2.5Y 6/2) and few fine distinct strong brown (7.5YR 5/6) mottles; weak medium and coarse subangular blocky structure; very firm; common distinct clay films; strongly acid; clear smooth boundary.

C—52 to 60 inches; light olive brown (2.5Y 5/4) clay; few fine prominent light olive gray (5Y 6/2) mottles; massive; very firm; common fine black accumulations; moderately acid.

Depth to bedrock is about 4 to 7 feet. Fragments of chert or sandstone generally are less than 5 percent, but in some pedons range to 10 percent. These soils are moderately acid or strongly acid in the upper horizons, but where limed the surface layer is less acid. The soils range from moderately acid to slightly alkaline in the lower horizons over bedrock.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6. In most pedons it has mottles in shades of brown throughout the subsoil and has gray mottles below a depth of about 20 inches. It is silty clay loam, silty clay, or clay. In most pedons it is silty clay loam in the upper part and clay in the lower part.

The C horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 2 to 4. It has mottles in shades of brown, yellow, and gray.

Carbo Series

The Carbo series consists of moderately deep, well drained soils that have slow permeability. These soils formed in clayey residuum derived from limestone. They are on side slopes on the middle and lower part of the Cumberland Plateau Escarpment. Slopes are 20 to 60 percent.

Typical pedon of Carbo silt loam, in an area of Carbo-Rock outcrop complex, 20 to 60 percent slopes; 4.35 miles southeast on Highway 127 from intersection with Highway 28 at Dunlap, 200 feet east of road, 450 feet north of quarry; (atlas sheet 13):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; very friable; many very fine and fine roots; many very fine and fine pores; 10 percent fragments of limestone up to 6 inches across; moderately acid; abrupt smooth boundary.

BA—2 to 5 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; many very fine and fine pores; 10 percent fragments of limestone up to 8 inches across; moderately acid; clear smooth boundary.

Bt1—5 to 15 inches; dark yellowish brown (10YR 4/4) clay; moderate medium subangular blocky structure; very firm; common fine and medium and few coarse roots; common fine pores; many distinct clay films; 5 percent fragments of limestone up to 10 inches across; neutral; gradual smooth boundary.

Bt2—15 to 25 inches; dark yellowish brown (10YR 4/6) clay; moderate medium subangular blocky structure; very firm; few fine and medium roots; few fine pores; many distinct clay films; neutral; gradual smooth boundary.

Bt3—25 to 30 inches; yellowish brown (10YR 5/6) clay; common fine distinct light olive brown (2.5Y 5/4) mottles; moderate coarse subangular blocky structure; very firm; few fine and medium roots; slightly alkaline; abrupt wavy boundary.

R—30 inches; limestone.

Depth to bedrock ranges from 20 to 40 inches. Fragments of limestone range from 0 to 10 percent. These soils are moderately acid or slightly alkaline.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or silty clay loam.

In most pedons a horizon that is transitional in color and texture separates the A and B horizons. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6. In some pedons in the lower part the Bt horizon has hue of 5YR. It is clay.

The C horizon, where it occurs, has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 or 6, or it is mottled without a dominant matrix color. In most

pedons it has mottles in shades of brown and gray. It is clay.

Cobstone Series

The Cobstone series consists of very deep, well drained soils that have moderately rapid permeability. These soils formed in loamy alluvium that derived from sandstone and that have a high content of gravel, cobbles, and stones (fig. 14). They are on alluvial fans and low terraces near the base of the Cumberland Plateau Escarpment in the Sequatchie Valley. Slopes are 0 to 5 percent.

Typical pedon of Cobstone cobbly fine sandy loam, 0 to 3 percent slopes, rarely flooded; north of Dunlap, 1.2 miles north on Highway 127 from intersection with Highway 8, about 1,500 west of highway; (atlas sheet 9):

A—0 to 4 inches; dark brown (10YR 3/3) cobbly fine sandy loam; moderate fine granular structure; very friable; many fine and common medium and coarse roots; many fine pores; 25 percent pebbles and cobbles of sandstone up to 8 inches across; moderately acid; clear wavy boundary.

BE—4 to 10 inches; strong brown (7.5YR 4/6) cobbly fine sandy loam; weak fine subangular blocky structure; very friable; many fine and common medium and coarse roots; many fine pores; 25 percent pebbles and cobbles of sandstone up to 9 inches across; strongly acid; gradual clear wavy boundary.

Bt1—10 to 26 inches; strong brown (7.5YR 5/6); very cobbly sandy loam; weak fine subangular blocky structure; very friable; common fine and medium roots; common fine pores; very few faint clay films; 60 percent pebbles, cobbles, and stones of sandstone up to 14 inches across; strongly acid; gradual wavy boundary.

Bt2—26 to 50 inches; strong brown (7.5YR 5/8) extremely cobbly sandy clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; common fine pores; very few faint clay films; 70 percent pebbles, cobbles, and stones of sandstone up to 16 inches across; very strongly acid; gradual wavy boundary.

C—50 to 70 inches; strong brown (7.5YR 5/6) extremely cobbly sandy clay loam; massive; very friable; 80 percent pebbles, cobbles, and stones of sandstone up to 14 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Rounded pebbles, cobbles, and stones of mostly sandstone range from 25 to 50 percent in the A and BE horizons and from 35 to 80 percent in the Bt and C horizons. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 4, and chroma of 2 to 4. In some pedons it is less than 5 inches thick and has value of 3. In the fine earth fraction it is fine sandy loam, loam, or sandy loam.

In most pedons a horizon that is transitional in color and texture separates the A and B horizons. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. In the fine earth fraction it is loam, sandy loam, or sandy clay loam.

The BC and C horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. In the fine earth fraction they are loam, sandy loam, or sandy clay loam.

Colbert Series

The Colbert series consists of deep, moderately well drained soils that have very slow permeability. These soils formed in residuum derived from limestone. They are on uplands in the Sequatchie Valley. Slopes are 5 to 20 percent.

Typical pedon of Colbert silty clay loam, in an area of Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded; 2.2 miles east on Old York Road from Dunlap, 0.25 mile north on East Valley Road, 55 feet east of road; (atlas sheet 11):

Ap—0 to 7 inches; brown (10YR 4/3) silty clay loam; weak fine granular structure; friable; many very fine and fine roots; common fine pores; slightly acid; abrupt smooth boundary.

Bt1—7 to 13 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; firm; common very fine and fine roots; few fine pores; common distinct clay films; few fine black accumulations; slightly acid; gradual smooth boundary.

Bt2—13 to 24 inches; yellowish brown (10YR 5/6) clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; very firm; few very fine and fine roots; common distinct clay films; few fine black accumulations; slightly acid; gradual smooth boundary.

Bt3—24 to 41 inches; light olive brown (2.5Y 5/6) clay; few fine prominent olive gray (5Y 5/2) mottles; moderate medium and coarse subangular structure; very firm; common distinct clay films; common pressure faces; neutral; gradual smooth boundary.

C—41 to 52 inches; olive (5Y 5/3) clay; common fine

faint olive gray (5Y 5/2) mottles; massive; very firm; common pressure faces; common fine black accumulations; slightly alkaline.

R—52 inches; hard limestone.

Depth to bedrock is 40 to 60 inches. These soils are slightly acid to strongly acid in the upper part and moderately acid or slightly alkaline in the lower part.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is loam, but in most pedons it is silty clay loam or silt loam. The E horizon, where it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is silt loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. In most pedons in the lower part it has mottles in shades of brown and gray. It is silty clay, but in most pedons it is clay.

The C horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 to 6. In most pedons it has mottles in shades of brown, olive, and gray. It is clay or silty clay.

Enders Series

The Enders series consists of deep, well drained soils that have very slow permeability. These soils formed in clayey residuum derived from shale. They are on shale ridges at the base of the Cumberland Plateau Escarpment in the Sequatchie Valley. Slopes range from 20 to 50 percent.

Typical pedon of Enders silt loam, 20 to 50 percent slopes; 0.4 mile east of East Valley Road on Hensen Gap Road, 0.1 mile north on lane, 350 feet east of lane; (atlas sheet 11):

Oi—1 inch to 0; partly decomposed and undecomposed pine needles and hardwood leaves and twigs.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; many fine and medium tubular pores; 10 percent fragments of sandstone and shale up to 2 inches across; strongly acid; abrupt smooth boundary.

E—2 to 5 inches; light yellowish brown (10YR 6/4) silt loam; weak fine granular structure; very friable; many fine and medium roots; common fine pores; 10 percent fragments of sandstone and shale up to 2 inches across; strongly acid; clear smooth boundary.

Bt1—5 to 9 inches; yellowish red (5YR 5/6) silty clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common medium roots; common fine pores; few faint clay films on faces of peds; 15 percent fragments of shale and sandstone up to 4 inches across; strongly acid; gradual smooth boundary.

Bt2—9 to 22 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; 2 percent fragments of shale up to 2 inches across; very strongly acid; clear smooth boundary.

Bt3—22 to 38 inches; yellowish red (5YR 5/6) channery clay; common fine distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; 25 percent fragments of shale up to 2 inches across; very strongly acid; gradual smooth boundary.

BC—38 to 50 inches; yellowish red (5YR 5/6) very channery silty clay; many fine prominent brownish yellow (10YR 6/6) and common fine prominent light yellowish brown (2.5Y 6/4) mottles; weak medium subangular blocky structure; firm; 40 percent fragments of shale up to 2 inches across; very strongly acid; abrupt smooth boundary.

Cr—50 to 55 inches; olive soft shale; coatings of yellowish red fine earth between layers and in cracks.

Depth to soft shale ranges from 40 to more than 60 inches. Fragments of sandstone and shale up to 6 inches across range from 0 to 15 percent in the A and E horizon and in the upper part of the Bt horizon; fragments of shale up to 4 inches across range from 0 to 35 percent in the lower part of the Bt horizon and up to 50 percent in the BC horizon. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon, where it occurs, has hue of 10YR, value of 4, and chroma of 3 or 4. The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is loam or silt loam.

In some pedons, horizons that are transitional in color and texture separate the E and Bt horizons. The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. In the fine earth fraction it is clay, silty clay, or silty clay loam. In some pedons it has mottles in shades of red and brown.

The BC horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. It has mottles in shades of brown, red, yellow, and gray. The gray mottles likely are from shale, not wetness. In some pedons it is mottled in these shades without a dominant matrix

color. In the fine earth fraction it is silty clay loam, silty clay, or clay.

Etowah Series

The Etowah series consists of very deep, well drained soils that have moderate permeability. These soils formed in old alluvium and colluvium. They are on high stream terraces, broad uplands, and foot slopes in the Sequatchie Valley. Slopes are 2 to 12 percent.

Typical pedon of Etowah silt loam, 2 to 5 percent slopes; south of Dunlap, from intersection of Highway 127, about 3.1 miles south on East Valley Road, 200 feet east on farm road, 100 feet north of road; (atlas sheet 15):

Ap—0 to 9 inches; dark brown (7.5YR 3/2) silt loam; weak medium granular structure; very friable; many very fine and fine roots; common very fine and fine pores; slightly acid; abrupt smooth boundary.

BA—9 to 16 inches; brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; common very fine and fine roots; many very fine and fine pores; few fine black accumulations; slightly acid; clear smooth boundary.

Bt1—16 to 23 inches; strong brown (7.5YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; many very fine and fine pores; few faint clay films; strongly acid; clear smooth boundary.

Bt2—23 to 32 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; common distinct clay films; strongly acid; gradual smooth boundary.

Bt3—32 to 72 inches; red (2.5YR 4/6) silty clay loam; strong medium subangular blocky structure; friable; few very fine and fine roots; common very fine and fine pores; many prominent clay films; very strongly acid.

Depth to bedrock is more than 60 inches. Most pedons have few or no rock fragments, but some pedons have up to 15 percent. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The Ap horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 to 4. In some pedons, in eroded areas, it also has value of 4. It is loam, but in most pedons it is silt loam.

In most pedons horizons transitional in color and texture separate the A and B horizons. The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it has mottles in shades of brown and red. It is silty clay loam or clay loam, but in some pedons it is clay below a depth of about 40 inches.

Fullerton Series

The Fullerton series consists of very deep, well drained soils that have moderate permeability. These soils formed in cherty, clayey residuum that weathered from limestone. They are on side slopes and ridgetops of cherty limestone ridges in the Sequatchie Valley. Slopes range from 5 to 30 percent.

Typical pedon of Fullerton gravelly loam, 15 to 30 percent slopes; north of Dunlap, 0.9 mile east on Sprouse Hill Road from intersection with Highway 127, 1.1 miles east on Kelly Cross Road, 0.75 mile northwest on Bostontown Road, 300 feet north of road; (atlas sheet 7):

Ap—0 to 5 inches; brown (10YR 4/3) gravelly loam; moderate medium granular structure; very friable; many very fine and fine roots; 20 percent fragments of chert up to 2 inches across; strongly acid; abrupt wavy boundary.

E—5 to 9 inches; light yellowish brown (10YR 6/4) gravelly loam; weak fine and medium granular structure; very friable; many very fine and fine roots; many very fine and fine pores; 20 percent fragments of chert up to 3 inches across; strongly acid; gradual smooth boundary.

BE—9 to 15 inches; strong brown (7.5YR 5/6) gravelly loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; common very fine and fine roots; common very fine and fine pores; 20 percent fragments of chert up to 3 inches across; very strongly acid; clear smooth boundary.

Bt1—15 to 21 inches; yellowish red (5YR 5/6) gravelly silty clay loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; common distinct clay films; 25 percent fragments of chert up to 6 inches across; very strongly acid; clear smooth boundary.

Bt2—21 to 39 inches; red (2.5YR 4/6) gravelly clay; strong medium angular blocky and subangular blocky structure; firm; few very fine and fine roots; common very fine and fine pores; 25 percent fragments of chert up to 9 inches across; very strongly acid; gradual smooth boundary.

Bt3—39 to 72 inches; red (2.5YR 5/8) gravelly clay; few fine prominent strong brown (7.5YR 5/8) mottles; strong medium angular and subangular blocky structure; firm; few fine pores; many distinct

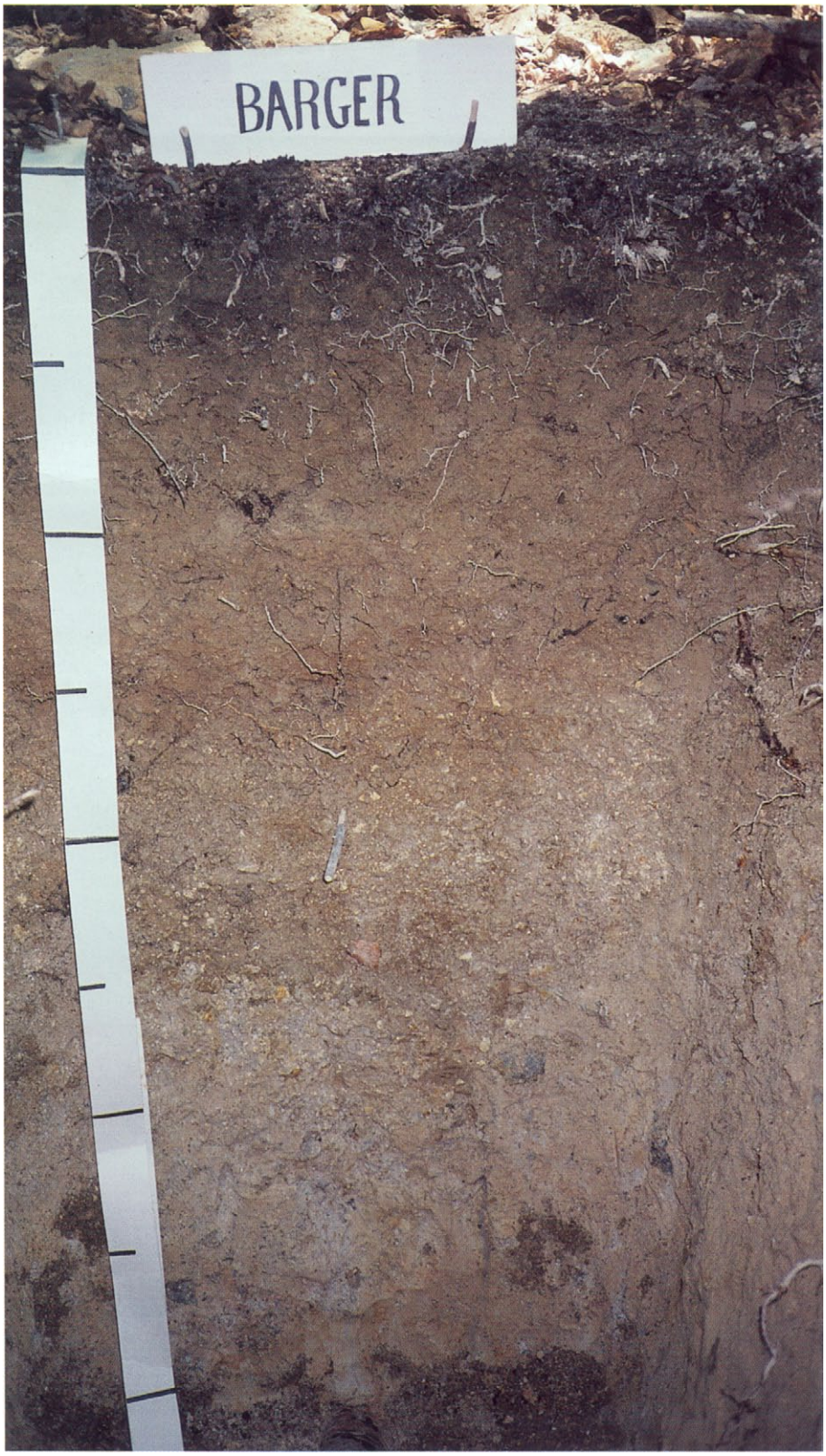

Figure 12.—Barger soils have a fragipan at a depth of about 19 inches. It contains a large amount of gravel. The scale is in 6-inch increments.

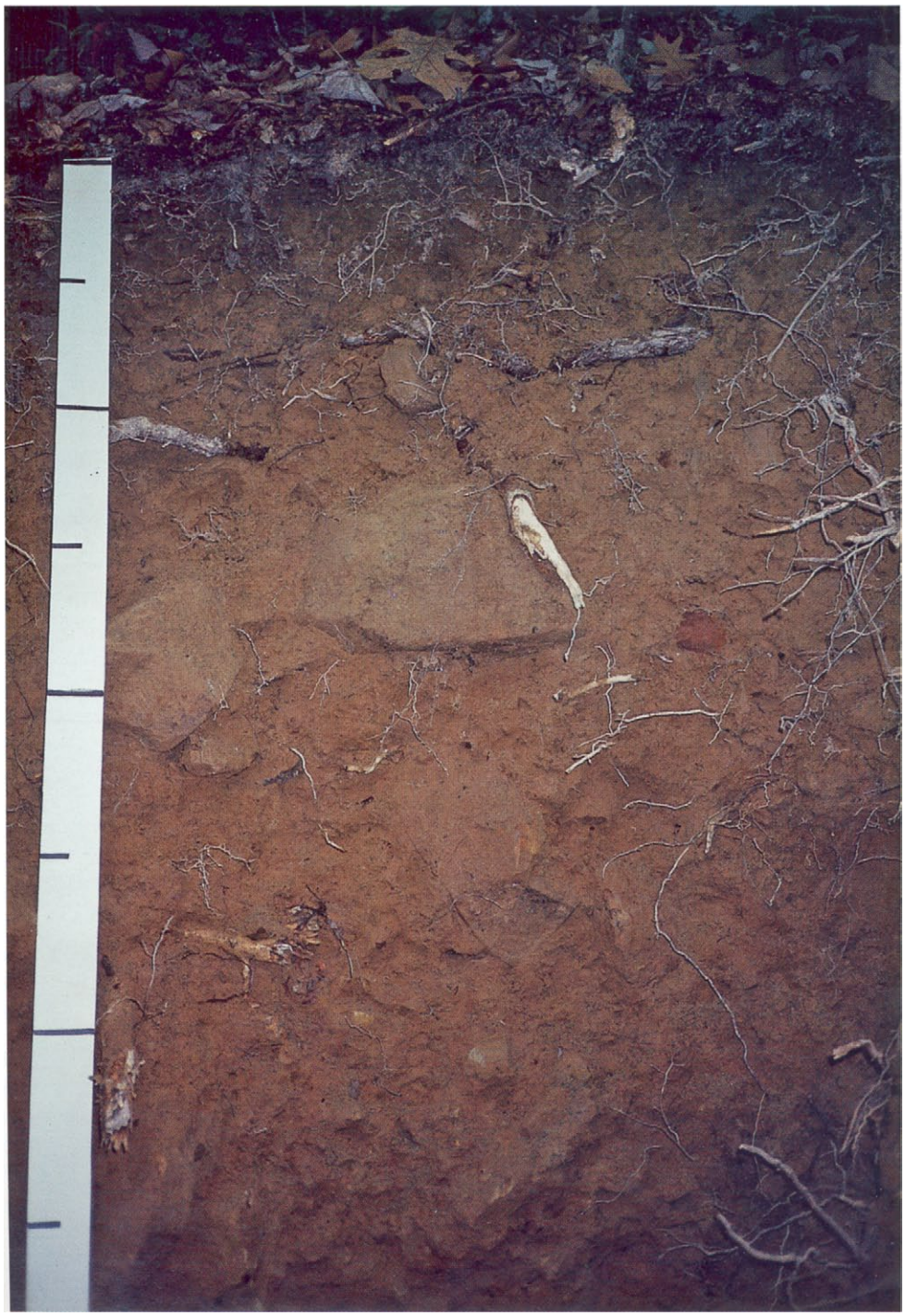

Figure 13.— Bouldin soils have stones and boulders on the surface. They have numerous stones and cobbles throughout. The scale is in 6-inch increments.

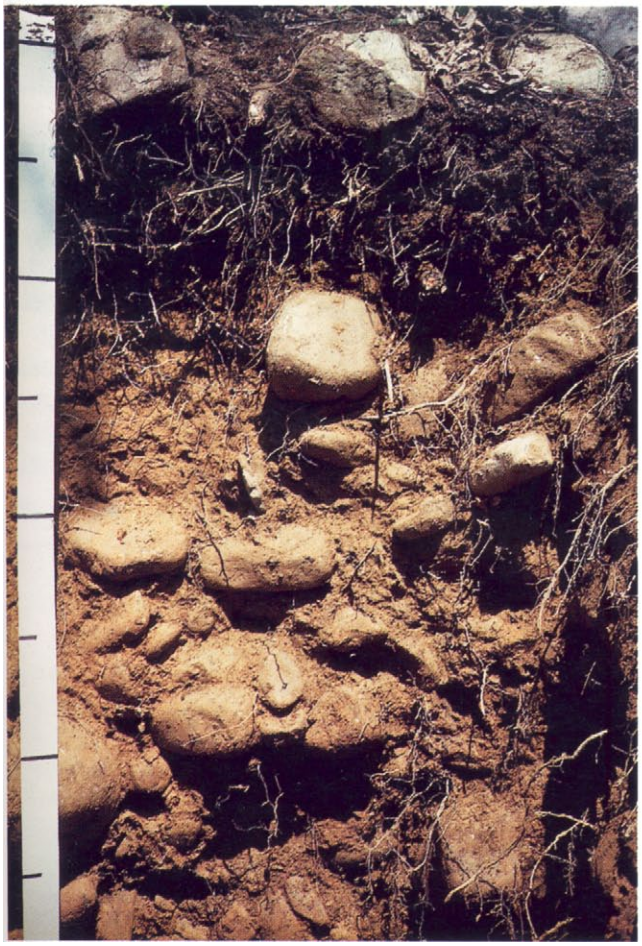

Figure 14.—Cobstone soils have many cobbles and gravel both on the surface and throughout the profile. The scale is in 6-inch increments.

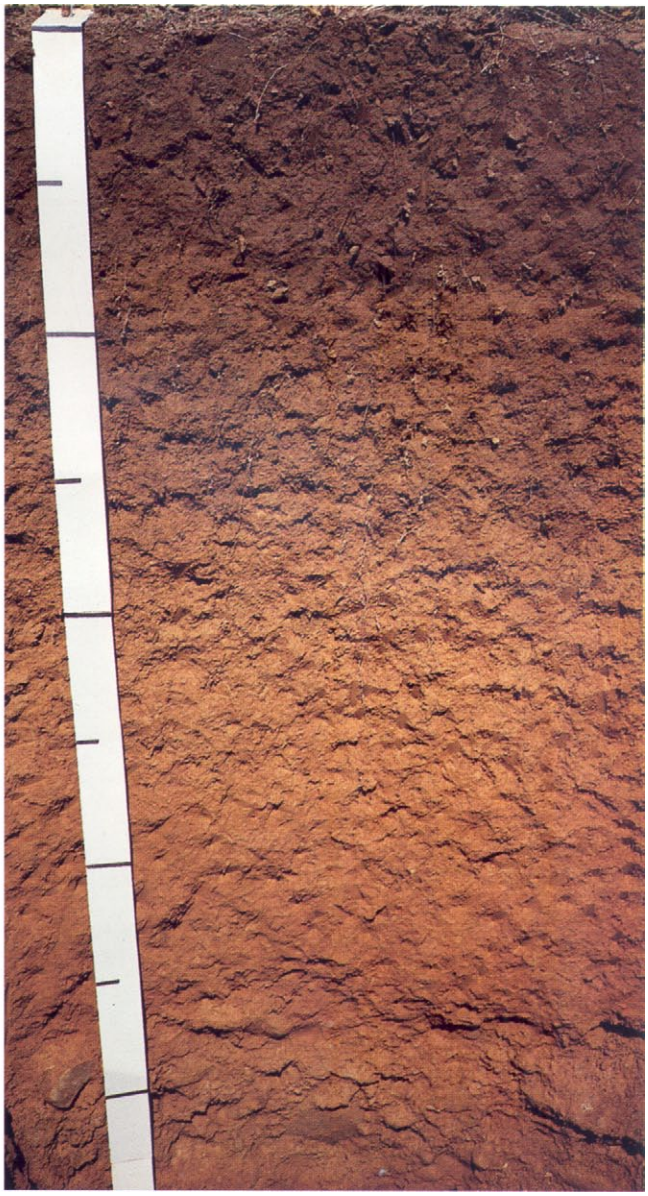

Figure 15.—Sequatchie soils have a dark surface layer and a brown, loamy subsoil. The underlying material, below a depth of 46 inches, has numerous cobbles and gravel. The scale is in 6-inch increments.

Figure 16.—Whitwell soils are moderately well drained. They have gray mottles at a depth of 24 inches. They are dominantly gray below a depth of 40 inches. The scale is in 6-inch increments.

clay films; 30 percent fragments of chert up to 9 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Fragments of chert up to 3 inches across range from 15 to 25 percent in the A and E horizons and from 15 to 35 percent in the Bt horizon. In some pedons a few fragments range to 10 inches across. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 or 4. Some pedons have an E horizon that has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. In the fine earth fraction the A and E horizons are loam or silt loam.

In some pedons a horizon that is transitional in color and texture separates the A or E horizon and the Bt horizon. The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it has mottles in shades of brown and red. In the fine earth fraction it is clay, but in the upper few inches it ranges to silty clay loam.

Gilpin Series

The Gilpin series consists of moderately deep, well drained soils that have moderate permeability. These soils formed in loamy residuum derived from weathered shale and siltstone. They are on upland ridges and side slopes of the Cumberland Plateau. Slopes are 6 to 60 percent.

Typical pedon of Gilpin channery silt loam, 20 to 45 percent slopes; 7.7 miles southeast on Highway 127 from intersection with Highway 28 at Dunlap, 1.2 miles north on Johnson Creek Road, 150 feet east of road; (atlas sheet 15):

Oi—1 inch to 0; partly decomposed leaf litter.

A—0 to 1 inch; dark brown (10YR 3/3) channery silt loam; moderate fine granular structure; very friable; many fine and medium roots; many fine pores; 20 percent fragments of shale and sandstone up to 6 inches across; very strongly acid; abrupt smooth boundary.

E—1 to 4 inches; brown (10YR 5/3) channery silt loam; moderate fine granular structure; very friable; many fine and medium and few coarse roots; many fine pores; 20 percent fragments of shale and sandstone up to 6 inches across; very strongly acid; clear smooth boundary.

BE—4 to 11 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; common fine pores; 20 percent fragments of shale and sandstone up to 2 inches across; very strongly acid; gradual smooth boundary.

Bt—11 to 25 inches; yellowish brown (10YR 5/6) channery silt loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; common fine pores; few faint clay films; 30 percent fragments of shale up to 2 inches across; very strongly acid; gradual smooth boundary.

BC—25 to 30 inches; yellowish brown (10YR 5/6) very channery silt loam, weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; few fine pores; 40 percent fragments of shale up to 2 inches across; strongly acid; clear wavy boundary.

C—30 to 34 inches; strong brown (7.5YR 5/6) very channery silt loam stratified in thin seams with olive brown (2.5Y 4/4), soft shale that has thin coatings of yellowish red (5YR 5/6); massive; friable; few fine, medium, and coarse roots; 60 percent fragments of shale up to 3 inches across; strongly acid.

Cr—34 to 45 inches; olive brown (2.5Y 4/4) and light yellowish brown (10YR 6/4) thinly bedded and fractured, soft shale and siltstone.

Depth to rippable shale or siltstone ranges from 20 to 40 inches. Fragments of siltstone, shale, and sandstone up to 6 inches across range from 5 to 25 percent in the A horizon and from 5 to 35 percent in the Bt horizon. Fragments of shale and siltstone range from 30 to 90 percent in the BC and C horizons. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon and E horizon, where they occur, have hue of 10YR, value of 4 or 5, and chroma of 2 to 4. In the fine earth fraction it is silt loam or loam.

Some pedons have horizons that are transitional in color and texture between the E and B horizons. The Bt horizon has hue of 10YR or 7.5YR, value and chroma of 4 to 6. In the fine earth fraction it is loam, silt loam, clay loam, or silty clay loam. The C horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 6. In the fine earth fraction it is silt loam, loam, or silty clay loam.

Hamblen Series

The Hamblen series consists of very deep, moderately well drained soils that have moderate permeability. These soils formed in loamy alluvium. They are on flood plains along the Sequatchie River

and along tributary streams in the Sequatchie Valley. Slopes are 0 to 2 percent.

Typical pedon of Hamblen loam, occasionally flooded; 3.9 miles south on Highway 28 from intersection with Highway 127 at Dunlap, 1.5 miles east on Stone Cave Road to bridge on Sequatchie River, 450 feet east of bridge; (atlas sheet 13):

Ap—0 to 9 inches; dark brown (10YR 4/3) loam; weak medium granular structure; very friable; common very fine and fine roots; common very fine and fine pores; neutral; abrupt smooth boundary.

Bw1—9 to 14 inches; dark yellowish brown (10YR 4/6) loam; moderate medium granular and weak fine subangular blocky structure; friable; common very fine and fine roots; many very fine and fine pores; slightly acid; clear smooth boundary.

Bw2—14 to 20 inches; yellowish brown (10YR 5/4) loam; common fine faint dark yellowish brown (10YR 4/6) and pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; common very fine and fine roots; many very fine and fine pores; few fine black and brown accumulations; slightly acid; gradual smooth boundary.

Bw3—20 to 36 inches; yellowish brown (10YR 5/4) loam; common fine distinct light brownish gray (10YR 6/2) and common fine faint yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few very fine roots; many very fine and fine pores; common fine and medium black and brown accumulations; moderately acid; clear smooth boundary.

Bw4—36 to 44 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; many very fine and fine pores; strongly acid; clear smooth boundary.

Cg—44 to 65 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8) and common fine distinct light yellowish brown (10YR 6/4) mottles; massive; friable; common very fine and fine pores; strongly acid.

Depth to bedrock is more than 72 inches. These soils are strongly acid to neutral. Gravel makes up less than 10 percent of each horizon. Most pedons have few or no fragments.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is loam or silt loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. In some pedons in the lower part it also has chroma of 2. In most pedons it has mottles in shades of red, brown, and gray. It has mottles that has chroma of 2 within 24 inches of the surface. It is loam, silt loam, or clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6, or it is mottled without a dominant matrix color. In most pedons it has mottles in shades of brown and gray. It is loam, silt loam, clay loam, or fine sandy loam.

Holston Series

The Holston series consists of very deep, well drained soils that have moderate permeability. These soils formed in old alluvium or colluvium. They are on high stream terraces and foot slopes in the Sequatchie Valley. Slopes are 2 to 12 percent.

Typical pedon of Holston loam, 2 to 5 percent slopes; south of Dunlap, from intersection of Highway 127, about 3.0 miles south on East Valley Road, 600 feet west on farm lane, 175 feet north of lane; (atlas sheet 15):

Ap—0 to 9 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; common very fine and fine roots; moderately acid; abrupt smooth boundary.

BA—9 to 15 inches; dark yellowish brown (10YR 4/4) loam; weak moderate granular structure and weak fine subangular blocky; friable; few very fine and fine roots; many very fine and fine and few medium pores; few fine black accumulations; moderately acid; abrupt smooth boundary.

Bt1—15 to 22 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; few very fine and fine roots; common very fine and fine and few medium pores; few faint clay films; common fine black accumulations; strongly acid; gradual smooth boundary.

Bt2—22 to 35 inches; strong brown (7.5YR 5/6) clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; common very fine and fine and few medium pores; common distinct clay films; common fine black accumulations; strongly acid; gradual smooth boundary.

Bt3—35 to 70 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish red (5YR 5/6) and few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular structure; friable; common very fine and fine and few medium pores; common distinct clay films; few fine black accumulations; common black stains on faces of peds; strongly acid.

Depth to bedrock is more than 60 inches. Fragments up to 2 inches across range from 0 to 15 percent in the upper part of the solum. They range to 25 percent below a depth of about 40 inches. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is loam.

In some pedons a horizon that is transitional in color and texture separates the A and B horizons. The Bt horizon has hue of 10YR or 7.5YR and, in the lower part, hue of 5YR, value of 4 or 5, and chroma of 6 or 8. In most pedons it has mottles in shades of brown and red. It is loam, but in most pedons it is clay loam.

Jefferson Series

The Jefferson series consists of very deep, well drained soils that have moderately rapid permeability. These soils formed in loamy colluvium derived from soils formed in residuum derived from acid sandstone, shale, and siltstone. They are on side slopes and foot slopes on the Cumberland Plateau. Slopes are 5 to 50 percent.

Typical pedon of Jefferson stony loam, 20 to 50 percent slopes; 2.5 miles west on Highway 399 from intersection with Highway 8 at Cagle, 0.4 mile north on Cherry Branch Road, 125 feet east of road; (atlas sheet 4):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) stony loam; moderate fine granular structure; very friable; many fine and medium and few coarse roots; many very fine and fine pores; 25 percent fragments of sandstone up to 24 inches across; strongly acid; clear smooth boundary.

BE—4 to 11 inches; dark yellowish brown (10YR 4/4) stony loam; weak fine subangular blocky structure; friable; many fine and medium and common coarse roots; many very fine and fine pores; 25 percent fragments of sandstone up to 16 inches across; very strongly acid; gradual smooth boundary.

Bt1—11 to 27 inches; brown (7.5YR 4/4) stony loam; moderate fine subangular blocky structure; friable; common fine, medium, and coarse roots; many very fine and fine pores; very few faint clay films in the lower part; 25 percent fragments of sandstone up to 18 inches across; strongly acid; clear smooth boundary.

Bt2—27 to 54 inches; dark yellowish brown (10YR 4/6) stony loam; moderate fine subangular blocky structure; friable; common fine, medium, and coarse roots; many very fine and fine pores; common faint clay films; 30 percent fragments of sandstone up to 20 inches across; very strongly acid; gradual smooth boundary.

BC—54 to 65 inches; yellowish brown (10YR 5/6) very stony loam; few medium distinct pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few fine and medium roots; common fine pores; 50 percent fragments of sandstone up to 20 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Fragments of mostly sandstone range from 5 to 35 percent to a depth of about 40 inches and from 20 to 60 percent below that depth. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The E and Ap horizons, where they occur, have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In the fine earth fraction it is fine sandy loam, but in most pedons it is loam.

In most pedons a horizon that is transitional in color and texture separates the E and B horizons. The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it has mottles in shades of red, yellow, and brown. In the fine earth fraction it is loam or clay loam.

The BC horizon and C horizon, where they occur, have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8, or they are mottled without a dominant matrix color. In most pedons it has mottles in shades of red, yellow, and brown. In the fine earth fraction it is loam or sandy loam.

Lily Series

The Lily series consists of moderately deep, well drained soils that have moderately rapid permeability. These soils formed in loamy residuum derived from sandstone. They are on ridgetops and side slopes on the Cumberland Plateau. Slopes are 2 to 20 percent.

Typical pedon of Lily loam, 6 to 12 percent slopes; 3.6 miles east on Hensen Gap Road from intersection with East Valley Road, 0.8 mile west on Bowman Road, 70 feet south of road; (atlas sheet 11):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 1 inch; dark brown (10YR 3/3) loam; moderate medium granular structure; very friable; many fine and medium roots; many fine and medium pores; very strongly acid; abrupt smooth boundary.

E—1 to 3 inches; brown (10YR 5/3) loam; moderate

medium granular structure; very friable; many medium roots; many very fine and fine pores; very strongly acid; clear smooth boundary.

BE—3 to 7 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable; many fine and medium roots; many very fine and fine pores; very strongly acid; clear smooth boundary.

Bt1—7 to 26 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine, medium, and coarse roots; many very fine and fine pores; few faint clay films; 2 percent fragments of sandstone up to 2 inches across; very strongly acid; gradual smooth boundary.

Bt2—26 to 30 inches; yellowish brown (10YR 5/8) loam; moderate fine subangular blocky structure; friable; common fine and medium roots; many very fine and fine pores; few faint clay films; 15 percent rounded quartzite pebbles up to 0.5 inch across; very strongly acid; abrupt smooth boundary.

R—30 inches; hard sandstone.

Depth to hard sandstone ranges from 20 to 40 inches. Fragments of soft and hard sandstone range from 0 to 15 percent in the solum and to 35 percent in the C horizon. These soils are extremely acid to strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon, where it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. In most pedons it is loam, but the range includes fine sandy loam and silt loam.

In some pedons horizons that are transitional in color and texture separate the E and B horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it has mottles in shades of brown, red, or yellow. It is loam, sandy clay loam, or clay loam.

The BC and C horizon, where they occur, have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It is loam or sandy loam.

Lonewood Series

The Lonewood series consists of deep, well drained soils that have moderate permeability. These soils formed in residuum derived mainly from sandstone and shale, but in the upper 1 to 3 feet they formed in a loamy mantle higher in silt. These soils are on broad plateaus and ridgetops of the Cumberland Plateau. Slopes are 2 to 12 percent.

Typical pedon of Lonewood silt loam, 2 to 5 percent slopes; 10.7 miles north on Highway 8 from intersection with Highway 127 at Dunlap, 2.3 miles east on White Oak Swamps Road, 150 feet north of road; (atlas sheet 3):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 1 inch; dark brown (10YR 3/3) silt loam; moderate fine granular structure; very friable; many fine and medium roots; many fine and medium pores; very strongly acid; abrupt smooth boundary.

E—1 to 4 inches; brown (10YR 5/3) silt loam; weak fine granular structure; very friable; common fine and medium and few coarse roots; many fine and medium pores; strongly acid; clear smooth boundary.

BE—4 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and medium pores; strongly acid; gradual smooth boundary.

Bt1—11 to 22 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; common fine and medium pores; few faint clay films; strongly acid; gradual smooth boundary.

Bt2—22 to 31 inches; yellowish brown (10YR 5/4) loam; few fine faint pale brown (10YR 6/3) mottles; moderate fine subangular blocky structure; friable; few fine and medium roots; common fine pores; few faint clay films; 10 percent rounded fragments of sandstone up to 0.5 inch in diameter; strongly acid; clear smooth boundary.

Bt3—31 to 42 inches; strong brown (7.5YR 5/6) clay loam; few fine prominent red (2.5YR 4/8) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine and medium roots; common fine pores; common distinct clay films; strongly acid; gradual smooth boundary.

Bt4—42 to 47 inches; strong brown (7.5YR 5/6) clay loam; common fine prominent red (2.5YR 4/8) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; few fine pores; common distinct clay films; 10 percent fragments of sandstone up to 2 inches across; strongly acid; clear smooth boundary.

C—47 to 57 inches; strong brown (7.5YR 5/6) loam that has thin seams of silty clay loam; common fine prominent red (2.5YR 4/8) and common fine distinct yellowish brown (10YR 5/8) mottles; massive; relict rock structure; friable; few fine and

medium roots; 10 percent fragments of sandstone up to 2 inches across; very strongly acid.
Cr—57 to 63 inches; strong brown (7.5YR 5/8) and red (2.5YR 4/8) soft, weathered sandstone.

Depth to bedrock ranges from 40 to 72 inches. Fragments of sandstone and shale are less than 5 percent in the upper part of the solum, less than 10 percent in the lower part the solum, and 5 to 20 percent in the C horizon. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon, where it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The E horizon, where it occurs, has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. It is silt loam or loam.

In some pedons horizons that are transitional in color and texture separate the E and B horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. In addition, the lower part of the Bt horizon has hue of 5YR or 7YR. In some pedons it has mottles in shades of red, yellow, and brown. It is silt loam, loam, clay loam, or silty clay loam.

The C horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 or 8, or is mottled without a dominant matrix color. In some pedons it has mottles in shades of red, yellow, and brown. In the fine earth fraction it is loam or sandy loam.

Melvin Series

The Melvin series consists of very deep, poorly drained soils that have moderate permeability. These soils formed in loamy alluvium. They are in slight depressions on flood plains along the Sequatchie River and along tributary streams in the Sequatchie Valley. Slopes are 0 to 2 percent.

Typical pedon of Melvin silt loam, in an area of Melvin and Newark silt loams, depressional; south of Dunlap, 0.6 mile east on Frank Tate Road from intersection with Highway 28, about 0.65 mile south on Hackwith Road, 0.15 mile south on farm lane, 150 feet east of lane; (atlas sheet 15):

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable; many very fine and fine roots; many very fine and fine pores; slightly acid; abrupt smooth boundary.
Bg1—6 to 26 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak fine subangular blocky; friable; common very fine and fine roots; many very fine and fine pores; common fine black and brown accumulations; strongly acid; gradual smooth boundary.
Bg2—26 to 36 inches; light gray (10YR 6/1) silt loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine subangular blocky; friable; few very fine and fine roots; common very fine and fine pores; strongly acid; clear smooth boundary.
Cg1—36 to 60 inches; gray (10YR 5/1) silt loam; common fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid; clear smooth boundary.
Cg2—60 to 66 inches; light brownish gray (10YR 6/2) loam; common medium prominent strong brown (7.5YR 5/8) mottles; massive; friable; strongly acid.

Depth to bedrock is more than 60 inches. These soils are strongly acid or moderately acid, but where limed the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Is some pedons it has mottles in shades of brown and gray. It is silt loam.

The Bg horizon has hue of 10YR or 2.5Y and value of 6 or 7 and chroma 2 or less or value of 4 or 5 and chroma of 1 or less. In most pedons it has mottles in shades of brown and gray. It is silt loam or silty clay loam.

The Cg horizon has the same colors as those in the Bg horizon. It is loam, silt loam, or silty clay loam.

Melvin soils in Sequatchie County range to strongly acid, which is outside the range defined for the series. This difference does not significantly affect the use or behavior of the soils.

Minvale Series

The Minvale series consists of very deep, well drained soils that have moderate permeability. These soils formed in colluvium and in the underlying residuum derived from cherty limestone. They are on benches and foot slopes in the Sequatchie Valley. Slopes are 5 to 20 percent.

Typical pedon of Minvale gravelly loam, 12 to 20 percent slopes; south of Dunlap, 0.6 mile east on John Burch Road from intersection with Highway 28, about 0.85 mile south on Hudlow Loop Road, 100 feet west of road; (atlas sheet 13):

Oi—1 inch to 0; partly decomposed leaves, pine needles, and twigs.
A—0 to 1 inch; dark grayish brown (10YR 4/2) gravelly

loam; weak fine granular structure; very friable; common fine and medium roots; many very fine and fine pores; 17 percent fragments of angular and subangular chert and sandstone up to 3 inches across; very strongly acid; abrupt smooth boundary.

E—1 to 5 inches; brown (10YR 5/3) gravelly loam; weak fine granular structure; very friable; common fine, medium, and coarse roots; many very fine and fine pores; 16 percent fragments of subangular chert and sandstone up to 2 inches across; very strongly acid; clear smooth boundary.

BE—5 to 9 inches; yellowish brown (10YR 5/6) gravelly loam; weak fine subangular blocky structure; friable; common fine, medium, and coarse roots; common very fine and fine pores; 16 percent fragments of subangular chert and sandstone up to 2 inches across; strongly acid; gradual smooth boundary.

Bt1—9 to 21 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; common very fine and fine pores; few faint clay films; 16 percent fragments of subangular chert up to 2 inches across; very strongly acid; gradual smooth boundary.

Bt2—21 to 30 inches; yellowish red (5YR 5/8) gravelly silty clay loam; few fine prominent pale brown (10YR 6/3) and few fine distinct red (2.5YR 5/8) mottles; moderate fine subangular structure; friable; common fine and medium and few coarse roots; common fine pores; common distinct clay films; 17 percent fragments of subangular chert; strongly acid; clear smooth boundary.

Bt3—30 to 53 inches; red (2.5YR 4/8) gravelly silty clay loam; moderate fine subangular blocky structure; friable; few fine, medium, and coarse roots; common fine pores; common distinct clay films; 20 percent fragments of subangular chert up to 3 inches across; strongly acid; clear smooth boundary.

Bt4—53 to 65 inches; strong brown (7.5YR 5/8) gravelly clay; common fine prominent red (2.5YR 5/8) mottles; moderate fine subangular blocky structure; friable; few fine pores; common distinct clay films; 35 percent fragments of subangular chert; very strongly acid.

Depth to bedrock is more than 60 inches. Fragments of chert and sandstone up to 3 inches across range from 10 to 25 percent in the A and E horizons. Fragments of chert range from 15 to 35 percent in the Bt horizon. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. A thin A horizon, where it occurs, also has value of 3. The E horizon, where it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. In the fine earth fraction the A and E horizons are loam or silt loam.

In most pedons, horizons that are transitional in color and texture separate the A or E horizons. The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons in the upper part it has hue of 10YR. In some pedons in the lower part it has mottles in shades of brown, red, or yellow. In the fine earth fraction in most pedons it is silty clay loam, but in some pedons it is silt loam and loam in the upper part and clay in the lower part.

Nella Series

The Nella series consists of very deep, well drained soils that have moderate permeability. These soils formed in loamy colluvium that has numerous cobbles and stones. They are on foot slopes at the base of the Cumberland Plateau Escarpment in the Sequatchie Valley. Slopes are 12 to 30 percent.

Typical pedon of Nella stony loam, 12 to 30 percent slopes; south of Dunlap, 1.9 miles south on Highway 28 from intersection with Highway 127, about 0.45 mile west on John Burch Road to Cookston Road, 1.0 mile south on Cookston Road to farm and mine road, 0.4 mile west on road, on east side of road; (atlas sheet 13):

Oi—1 inch to 0; partly decomposed leaf litter.

A—0 to 2 inches; dark grayish brown (10YR 4/2) stony loam; weak fine granular structure; very friable; many fine and medium and common coarse roots; many fine pores; 25 percent fragments of sandstone up to 14 inches across; strongly acid; clear smooth boundary.

BE—2 to 10 inches; yellowish brown (10YR 5/4) stony loam; weak fine subangular blocky structure; very friable; common fine, medium, and coarse roots; many fine and common medium pores; 25 percent fragments of sandstone up to 14 inches across; strongly acid; clear wavy boundary.

Bt1—10 to 16 inches; strong brown (7.5YR 5/6) stony loam; few fine distinct yellowish red (5YR 4/6) mottles; moderate fine subangular blocky structure; common fine, medium, and coarse roots; common fine pores; few faint clay films; 25 percent fragments of sandstone up to 14 inches across; very strongly acid; clear wavy boundary.

Bt2—16 to 28 inches; yellowish red (5YR 5/8) stony clay loam; few fine distinct red (2.5YR 4/8) and strong brown (7.5YR 5/8) mottles; moderate fine

subangular blocky structure; friable; common fine and medium and few coarse roots; common fine pores; common faint clay films; 25 percent fragments of sandstone up to 15 inches across; very strongly acid; gradual wavy boundary.

Bt3—28 to 48 inches; red (2.5YR 5/8) stony clay loam; few fine prominent strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; common fine and medium and few coarse roots; few fine pores; common distinct clay films; 25 percent fragments of sandstone up to 15 inches across; very strongly acid; gradual smooth boundary.

Bt4—48 to 70 inches; red (2.5YR 4/6) stony clay loam; few fine prominent strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; friable; few fine and medium roots; few fine pores; common distinct clay films; 35 percent fragments of sandstone up to 17 inches across; very strongly acid.

Depth to bedrock is more than 72 inches. Fragments of sandstone up to 24 inches or more across range from 5 to 35 percent. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The E or Ap horizon, where it occurs, has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. In the fine earth fraction it is loam or fine sandy loam.

In most pedons a horizon that is transitional in color and texture separates the A or E and B horizons. The Bt horizon has hue of 5YR or 2.5YR and, in the upper part, 7.5YR, value of 4 or 5, and chroma of 6 or 8. In the fine earth fraction in most pedons it is clay loam, but in some pedons ranges to loam in the upper part and clay in the lower part.

Newark Series

The Newark series consists of very deep, somewhat poorly drained soils that have moderate permeability. These soils formed in mixed, loamy alluvium. They are in slight depressions on flood plains along the Sequatchie River and along tributary streams in the Sequatchie Valley. Slopes are 0 to 2 percent.

Newark soils are near Hamblen and Melvin soils. Hamblen soils are moderately well drained and do not have horizons with dominant chroma of 2 or less within a depth of 24 inches. Also, Hamblen soils have a particle-size control section that is more than 15 percent fine sand and coarser material. Melvin soils are poorly drained and have dominant chroma of 2 or less in all horizons below a depth of 10 inches.

Typical pedon of Newark silt loam, in an area of Melvin and Newark silt loams, depressional; south of Dunlap, 0.6 mile east on Frank Tate Road from intersection with Highway 28, about 0.65 mile south on Hackwith Road, 0.15 mile south on farm lane, 275 feet east of lane; (atlas sheet 15):

Ap—0 to 5 inches; brown (10YR 5/3) silt loam; weak fine granular structure; very friable; many very fine and fine roots; many very fine and fine pores; slightly acid; abrupt smooth boundary.

Bw—5 to 14 inches; brown (10YR 5/3) silt loam; common fine faint light brownish gray (10YR 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium granular structure; friable; many very fine and fine roots; many very fine and fine pores; strongly acid; clear smooth boundary.

Bg1—14 to 32 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; few fine brown accumulations; strongly acid; gradual wavy boundary.

Bg2—32 to 43 inches; light gray (10YR 6/1) silt loam; weak medium prismatic structure parting to weak fine subangular blocky; friable; few very fine and fine roots; common very fine and fine pores; common fine and medium black and brown accumulations; strongly acid; gradual wavy boundary.

Cg1—43 to 60 inches; gray (10YR 5/1) silt loam; few fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid; clear smooth boundary.

Cg2—60 to 68 inches; light gray (10YR 6/1) loam; common medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; strongly acid.

Depth to bedrock is more than 60 inches. These soils are strongly acid or moderately acid, but where limed the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma 2 or 3. In some pedons it has mottles in shades of brown and gray. It is loam, but in most pedons it is silt loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3. In most pedons it has mottles in shades of brown and gray. It is silt loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is within 20 inches of the

surface. In most pedons it has mottles in shades of brown and gray. It is silt loam or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral. In most pedons it has mottles in shades of brown and gray. It is silt loam or silty clay loam, but in some pedons it has subhorizons of loam.

Newark soils in Sequatchie County range to strongly acid, which is outside the range defined for the series. This difference does not significantly affect the use or behavior of the soils.

Pailo Series

The Pailo series consists of very deep, well drained soils that have moderately rapid permeability in the upper part and moderately slow permeability in the lower part. These soils formed in a loamy mantle high in chert content and in the underlying clayey residuum of limestone. They are on narrow ridges and side slopes in the Sequatchie Valley. Slopes are 12 to 50 percent.

Typical pedon of Pailo gravelly loam, in an area of Bodine and Pailo gravelly loams, 20 to 50 percent slopes; 0.6 mile east on John Burch Road from intersection with Highway 28 south of Dunlap, 0.7 mile south on Hudlow Loop Road, 450 feet east of road; (atlas sheet 13):

Oi—1 inch to 0; partly decomposed and undecomposed hardwood leaves and twigs.

A—0 to 1 inch; dark brown (10YR 3/3) gravelly loam; moderate fine granular structure; very friable; many fine and medium roots; many fine and medium pores; 30 percent subangular fragments of chert up to 1 inch across; very strongly acid; abrupt smooth boundary.

E—1 to 5 inches; brown (10YR 5/3) gravelly loam; moderate fine granular structure; very friable; many fine, medium, and coarse roots; many fine and medium pores; 25 percent angular fragments of chert up to 2 inches across; very strongly acid; gradual smooth boundary.

BE—5 to 12 inches; yellowish brown (10YR 5/4) gravelly loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; common fine and medium pores; 30 percent angular fragments of chert up to 3 inches across; very strongly acid; clear smooth boundary.

Bt1—12 to 27 inches; yellowish brown (10YR 5/6); extremely cherty loam; weak fine subangular blocky structure; friable; common fine, medium, and coarse roots; common fine and medium pores; few faint clay films; 65 percent angular fragments of chert up to 5 inches across; very strongly acid; clear wavy boundary.

2Bt2—27 to 31 inches; yellowish red (5YR 5/8) clay loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; firm; few fine and medium roots; few fine pores; common faint clay films; 15 percent angular fragments of chert up to 5 inches across; very strongly acid; gradual wavy boundary.

2Bt3—31 to 67 inches; yellowish red (5YR 5/8) clay; common fine and medium prominent yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6) mottles; strong fine angular blocky structure; firm; common distinct clay films; 15 percent angular fragments of chert up to 5 inches across; very strongly acid.

Depth to bedrock is more than 72 inches. Angular fragments of chert up to 5 inches across range from 25 to 50 percent in the A, E, and BE horizons. Angular fragments of chert up to 6 inches across range from 35 to 75 percent in the Bt horizon. Angular fragments of chert up to 5 inches across range from 3 to 15 percent in the 2Bt horizon. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In the fine earth fraction it is loam, sandy loam, or loamy sand.

In most pedons horizons that are transitional in color and texture separate the E and Bt horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8. In the fine earth fraction it is loam, clay loam, or sandy clay loam.

The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. In most pedons it has mottles in shades of brown, yellow, or red. In some pedons it has small, manganese nodules. It is clay that ranges from 60 to 80 percent clay, but in some pedons at the top it is clay loam, sandy clay loam, or sandy clay up to 4 inches thick.

Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained soils that have rapid permeability. These soils formed in loamy residuum derived from sandstone. They are on ridges and side slopes of the Cumberland Plateau. Slopes are 5 to 60 percent.

Typical pedon of Ramsey sandy loam, 5 to 15 percent slopes; 3.6 miles east on Hensen Gap Road from intersection with East Valley Road, 2.2 miles

southwest on Bowman Road from intersection with Hensen Gap Road, 100 feet east of Bowman Road; (atlas sheet 11):

Oi—1 inch to 0; partly decomposed leaves and twigs.
A—0 to 2 inches; dark brown (10YR 3/3) sandy loam; moderate medium granular structure; very friable; many fine and medium roots; many very fine and fine pores; 3 percent fragments of sandstone and quartzite up to 1 inch across; very strongly acid; clear smooth boundary.
Bw1—2 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; many fine and medium and common course roots; common very fine and fine pores; 10 percent fragments of sandstone up to 6 inches across; very strongly acid; clear smooth boundary.
Bw2—11 to 16 inches; dark yellowish brown (10YR 4/4) cobbly loam; weak fine subangular blocky structure; friable; common fine, medium, and coarse roots; common very fine and fine pores; 20 to 25 percent fragments of sandstone and quartzite up to 8 inches across; very strongly acid; abrupt smooth boundary.
R—16 inches; hard sandstone.

Depth to bedrock ranges from 7 to 20 inches. Fragments of sandstone range from 0 to 35 percent. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E and Ap horizons, where they occur, have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In the fine earth fraction it is sandy loam, fine sandy loam, or loam.

The Bw and BC horizons, where they occur, have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 8. In the fine earth fraction it is loam, sandy loam, or fine sandy loam.

Sequatchie Series

The Sequatchie series consists of very deep, well drained soils that have moderate permeability (fig. 15). These soils formed in loamy alluvium. They are on stream terraces and alluvial fans in the Sequatchie Valley. Slopes are 0 to 6 percent.

Typical pedon of Sequatchie loam, 0 to 2 percent slopes; south of Dunlap, 1.9 miles south on Highway 28 from intersection with Highway 127, about 0.45 mile west on John Burch Road to Cookston Road, 2 miles south on Cookston Road to farm lane, 1,000 feet west, 215 feet south along fence, 175 feet west; (atlas sheet 13):

Ap—0 to 9 inches; dark brown (10YR 3/3) loam; moderate fine granular structure; very friable; many very fine and common fine roots; many very fine and fine tubular pores; moderately acid; abrupt smooth boundary.
BA—9 to 17 inches; brown (7.5YR 4/4) loam; moderate fine subangular blocky structure; friable; many very fine and common fine roots; many very fine and fine tubular pores; moderately acid; gradual smooth boundary.
Bt1—17 to 29 inches; strong brown (7.5YR 5/6) loam; moderate fine subangular blocky structure; friable; few very fine and fine roots; many very fine and common fine tubular pores; few faint clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.
Bt2—29 to 42 inches; strong brown (7.5YR 4/6) loam; moderate fine subangular blocky structure; friable; few very fine and fine roots; many very fine and fine tubular pores; few distinct clay films on ped faces and in pores; strongly acid; clear smooth boundary.
BC—42 to 46 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable; common very fine and fine tubular pores; 10 percent fragments of sandstone up to 5 inches across; very strongly acid; clear smooth boundary.
C—46 to 68 inches; strong brown (7.5YR 5/6) cobbly sandy loam; massive; very friable; 30 percent fragments of sandstone up to 10 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Content of sandstone pebbles and cobbles ranges from 0 to 15 percent in the A and B horizons and from 0 to 50 percent in the C horizon. These soils are very strongly acid or strongly acid, but where limed the surface layer and the upper part of the subsoil are less acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 2 or 3. It is silt loam or fine sandy loam, but in most pedons it is loam.

In most pedons a horizon that is transitional in color and texture separates the A and Bt horizons. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6 or hue of 5YR, value of 4, and chroma of 4 or 6. In some pedons it has a few mottles in shades of brown or red. It is loam or clay loam.

In most pedons a horizon that is transitional in color and texture separates the Bt and C horizon. The C horizon has hue of 7.5YR and 10YR, value of 5, and chroma of 3 to 6. In some pedons it has mottles in shades of brown and gray. In the fine earth fraction it is sandy loam, fine sandy loam, or loam.

Sewanee Series

The Sewanee series consists of deep, moderately well drained soils that have moderate permeability. These soils formed in loamy alluvium. They are on flood plains on the Cumberland Plateau. Slopes are 0 to 2 percent.

Typical pedon of Sewanee loam, occasionally flooded; 2.5 miles west on Highway 399 from intersection with Highway 8 at Cagle, 2.5 miles northwest on Cherry Branch Road, 1,000 feet west of road; (atlas sheet 4):

Oi—1 inch to 0; partly decomposed leaves.
A1—0 to 2 inches; dark brown (10YR 3/3) loam; moderate medium granular structure; very friable; many fine and few medium roots; many very fine and fine pores; very strongly acid; clear smooth boundary.
A2—2 to 7 inches; brown (10YR 4/3) loam; weak fine and medium granular structure; very friable; common fine and few medium roots; many very fine and fine pores; very strongly acid; clear smooth boundary.
Bw1—7 to 17 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; very friable; common fine and few medium roots; common very fine and fine pores; very strongly acid; gradual smooth boundary.
Bw2—17 to 39 inches; pale brown (10YR 6/3) loam; common medium prominent strong brown (7.5YR 5/6) and common medium distinct light gray (10YR 7/1) mottles; weak fine subangular blocky structure; very friable; few fine and medium roots; common fine pores; very strongly acid; clear smooth boundary.
C—39 to 60 inches; light brownish gray (10YR 6/2) sandy loam; common medium faint light gray (10YR 7/2) and few fine distinct yellowish brown (10YR 5/6) mottles; massive; very friable; very strongly acid.

Depth to bedrock ranges from 40 to 60 inches or more. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 3. It is silt loam, but in most pedons it is loam.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. In most pedons it has mottles in shades of brown, yellow, or gray. It has mottles of chroma 2 or less within 24 inches of the surface. It is silt loam, but in most pedons it is loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2, or it is mottled without a dominant matrix color. In most pedons it has mottles in shades of brown and gray. It is loam or sandy loam.

Sullivan Series

The Sullivan series consists of very deep, well drained soils that have moderate permeability. These soils formed in loamy alluvium. They are on flood plains along the Sequatchie River and along tributary streams in the Sequatchie Valley. Slopes are 0 to 2 percent.

Typical pedon of Sullivan loam, occasionally flooded; 1.5 miles east on Old York Road from intersection of Rankin and Cherry Street to bridge on Sequatchie River, 375 feet north of bridge, 150 feet east of river; (atlas sheet 11):

Ap—0 to 9 inches; dark brown (10YR 4/3) loam; weak fine granular structure; friable; common very fine and fine roots; many very fine and fine and common medium pores; slightly acid; abrupt smooth boundary.
Bw1—9 to 21 inches; dark brown (10YR 4/3) loam; weak fine subangular blocky structure; very friable; common very fine and fine roots; many very fine and fine and common medium pores; moderately acid; clear smooth boundary.
Bw2—21 to 31 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; common very fine and fine roots; many very fine and fine and common medium pores; moderately acid; clear wavy boundary.
C1—31 to 57 inches; dark yellowish brown (10YR 4/4) fine sandy loam; thin strata of light yellowish brown (10YR 6/4) loamy sand; massive; friable; few very fine and fine roots; common very fine, fine, and medium pores; moderately acid; clear smooth boundary.
C2—57 to 68 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct grayish brown (10YR 5/2) mottles; massive; friable; common very fine and fine pores; common brown accumulations up to 0.25 inch across; slightly acid.

Depth to bedrock is more than 72 inches. Rounded fragments up to 1 inch across range from 0 to 5 percent in each horizon. These soils are strongly acid to neutral.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. In some pedons a buried A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or

3. It is loam, fine sandy loam, or, in some pedons, silt loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, fine sandy loam, or, in some pedons, silt loam. The Bwb horizon, where it occurs, has the same range in color and texture as the Bw horizon.

The C horizon has a hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, sandy loam, or fine sandy loam.

Swafford Series

The Swafford series consists of very deep, moderately well drained soils that have moderately slow permeability. These soils formed in loamy alluvium. They have a fragic layer at a depth of about 2 feet. They are on terraces in the Sequatchie Valley. Slopes are 0 to 3 percent.

Typical pedon of Swafford loam, 0 to 3 percent slopes; south of Dunlap, 2.8 miles south on East Valley Road from intersection with Highway 127, about 175 feet east of road; (atlas sheet 15):

Ap—0 to 9 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; common very fine and fine roots; few very fine and fine pores; common black accumulations up to 0.25 inch across; strongly acid; abrupt smooth boundary.

BA—9 to 16 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; very friable; common very fine and fine roots; many very fine and fine and few medium pores; common black accumulations up to 0.25 inch across; strongly acid; clear smooth boundary.

Bt—16 to 22 inches; yellowish brown (10YR 5/4) loam; few fine faint brown (10YR 5/3) mottles; moderate fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; few faint clay films; common black accumulations up to 0.75 inch across; strongly acid; clear irregular boundary.

Btx1—22 to 46 inches; yellowish brown (10YR 5/6) loam that has vertical seams of light yellowish brown (10YR 6/4) up to 5 inches across; common fine distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to strong fine subangular blocky; firm; few fine roots; common very fine and fine pores; common distinct clay films on faces of peds; common reddish brown accumulations up to 0.75 inch across; about 50 percent brittle, by volume; very strongly acid; clear irregular boundary.

Btx2—46 to 65 inches; strong brown (7.5YR 5/8) loam; common medium prominent light brownish gray (10YR 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to strong medium subangular blocky; firm; few fine pores; common distinct clay films on faces of peds; about 50 percent brittle, by volume; very strongly acid.

Depth to bedrock is more than 60 inches. Depth to the fragic layer ranges from 18 to 36 inches. These soils are very strongly acid to moderately acid, but where limed the surface layer is less acid. In some pedons these soils have a few rock fragments.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is loam or silt loam.

In most pedons a horizon that is transitional in color and texture separates the A and B horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. In most pedons it has mottles in shades of brown or yellow. In most pedons it is loam or clay loam, but the range includes silt loam in the upper part.

The Btx horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. In most pedons it has mottles in shades of brown, yellow, and gray. It has mottles that have 2 chroma or less within a depth of 30 inches. It is loam or clay loam. The B't horizon, where it occurs, has colors and textures like those of the Btx horizon.

Talbott Series

The Talbott series consists of moderately deep, well drained soils that have moderately slow permeability. These soils formed in clayey residuum derived from limestone. They are on uplands in the Sequatchie Valley. Slopes are 5 to 20 percent.

Typical pedon of Talbott silty clay loam, in an area of Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded; northeast of Dunlap, 0.8 mile south on East Valley Road from intersection with Kelly Cross Road, 150 feet west of road; (atlas sheet 9):

Ap—0 to 5 inches; brown (10YR 4/3) silty clay loam; moderate medium granular structure; friable; common fine and medium roots; common fine pores; slightly acid; abrupt smooth boundary.

Bt1—5 to 21 inches; yellowish red (5YR 5/6) clay; common fine distinct strong brown (7.5YR 5/6) mottles; strong fine subangular blocky structure; firm; common fine and medium, and few coarse roots; few fine pores; common distinct clay films; moderately acid; common smooth boundary.

Bt2—21 to 28 inches; strong brown (7.5YR 5/6) clay; common fine distinct yellowish red (5YR 5/6) and few fine distinct yellowish brown (10YR 5/4) mottles; firm; few fine and medium roots; few fine pores; many distinct clay films; moderately acid; clear smooth boundary.

Bt3—28 to 34 inches; yellowish brown (10YR 5/4) clay; many fine distinct strong brown (7.5YR 5/6) mottles; very firm; few fine and medium roots; common distinct clay films; few black stains on faces of peds; slightly acid; clear smooth boundary.

C—34 to 37 inches; light olive brown (2.5Y 5/4) clay; many fine prominent yellowish red (5YR 5/6) mottles; massive; very firm; slightly alkaline; abrupt smooth boundary.

R—37 inches; hard limestone.

Depth to bedrock ranges from 20 to 40 inches. Fragments of limestone range from 0 to 10 percent. These soils are strongly acid to slightly acid, but in the layers over bedrock they range to slightly alkaline.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. In eroded areas an Ap horizon includes hue of 5YR and value of 5. The E horizon, where it occurs, has hue of 7.5YR or 10YR, value of 4 or 5, and chroma 3 or 4. The A and E horizons are silt loam, but in severely eroded areas they are also silty clay loam and clay.

In some pedons a horizon that is transitional in color and texture separates the A and Bt horizons. The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 or 6; in the lower part, it also has hue of 10YR. In some pedons it has mottles in shades of brown, yellow, and red. It is silty clay or clay and in the upper part includes silty clay loam.

The BC horizon, where it occurs, and the C horizon have hue of 2.5Y to 5YR, value and chroma of 4 to 6, or they are mottled without a dominant matrix color. In most pedons they have mottles in shades of brown, yellow, red, and gray. They are silty clay or clay.

Tasso Series

The Tasso series consists of very deep, moderately well drained soils that have moderately slow permeability. These soils formed in loamy colluvium and alluvium. They are on foot slopes of ridges in the Sequatchie Valley. Slopes are 5 to 12 percent.

Typical pedon of Tasso loam, 5 to 12 percent slopes; 4.9 miles south on Highway 28 from intersection with Highway 127 at Dunlap, 1.4 miles southeast on a paved road, 350 feet west of road; (atlas sheet 15):

Oi—1 inch to 0; partly decomposed leaves, pine needles, and twigs.

A—0 to 2 inches; dark grayish brown (10YR 4/2) loam; moderate fine granular structure; very friable; many fine and medium roots; many fine and medium pores; 5 percent rounded fragments of chert up to 1 inch across; very strongly acid; abrupt smooth boundary.

E—2 to 5 inches; brown (10YR 5/3) loam; moderate fine granular structure; very friable; many fine and medium and few coarse roots; many fine and medium pores; 5 percent rounded fragments of chert up to 2 inches across; very strongly acid; clear smooth boundary.

BE—5 to 10 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and medium pores; 5 percent rounded fragments of chert up to 1 inch across; very strongly acid; gradual smooth boundary.

Bt—10 to 21 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and medium pores; few faint clay films; 10 percent rounded fragments of chert up to 2 inches across; very strongly acid; clear smooth boundary.

Bt/Btx—21 to 31 inches; yellowish brown (10YR 5/4) gravelly clay loam; common medium prominent yellowish red mottles (Bt part); yellowish brown (10YR 5/4) loam; common fine faint pale brown (10YR 6/3) mottles (Btx part); weak coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle (Btx part); few fine and medium roots; common fine and medium pores; common distinct clay films; 15 percent rounded fragments of chert up to 2 inches across; strongly acid; clear wavy boundary.

2Bt—31 to 66 inches; yellowish red (5YR 5/6) gravelly clay loam; common fine prominent yellowish brown (10YR 5/4) and few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine and medium roots; common fine pores; common distinct clay films; 20 percent rounded fragments of chert up to 4 inches across; strongly acid.

Depth to bedrock is more than 60 inches. Fragments of chert range from 0 to 15 percent in the A, E, and BE horizons and to 25 percent in the horizons below. These soils are very strongly acid or strongly acid, but where limed the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon, where it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The E horizon, where it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is loam or silt loam.

In some pedons a horizon that is transitional in color and texture separates the Ap or E horizon and the Bt horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. In the Btx part it has mottles in shades of brown or gray. The gray mottles are below a depth of 30 inches. The horizon is loam, silt loam, or clay loam.

The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. In most pedons it has mottles in shades of brown or red. In the fine earth fraction it is clay loam, silty clay loam, or clay.

Waynesboro Series

The Waynesboro series consists of very deep, well drained soils that have moderate permeability. These soils formed in old alluvium. They are on ridges and side slopes in the Sequatchie Valley. Slopes are 2 to 30 percent.

Typical pedon of Waynesboro loam, 2 to 6 percent slopes; north of Dunlap along Highway 127 to intersection with Sprouse Hill Road, 0.9 mile east to intersection with Kelly Cross Road, 1.1 miles east along Kelly Cross Road to intersection with Bostontown Road, 950 feet southwest of the intersection; (atlas sheet 9):

Ap—0 to 8 inches; dark brown (7.5YR 3/4) loam; moderate fine granular structure; very friable; many very fine and fine roots; common very fine and fine pores; moderately acid; abrupt smooth boundary.

BA—8 to 14 inches; brown (7.5YR 4/4) loam; weak fine subangular blocky structure; friable; many very fine and fine roots; common very fine and fine pores; moderately acid; clear smooth boundary.

Bt1—14 to 22 inches; red (2.5YR 4/6) clay loam; moderate fine subangular blocky structure; friable; many very fine and fine roots; common very fine and fine pores; few faint clay films; common fine black accumulations; strongly acid; gradual smooth boundary.

Bt2—22 to 72 inches; dark red (2.5YR 3/6) clay; strong fine and medium angular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; many prominent clay films; common fine black accumulations; 2 percent of gravel up to 0.75 inch across; very strongly acid.

Depth to bedrock is more than 60 inches. These soils are very strongly acid or strongly acid, but where limed the surface layer and the upper part of the subsoil are less acid. In some pedons some horizons are up to 10 percent gravel.

The Ap horizon has hue of 5YR or 7.5YR, value and chroma of 3 or 4. It is silt loam, but in most pedons it is loam. In severely eroded areas it includes hue of 2.5YR, value of 5, and chroma of 6 and is clay loam or clay.

In some pedons a horizon that is transitional in color and texture separates the A and B horizons. The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6. In the middle and lower parts it also has value of 3. In some pedons in the lower part it has mottles in shades of brown, yellow, and red. It is clay loam or clay.

Whitwell Series

The Whitwell series consists of very deep, moderately well drained soils that have moderate permeability (fig.16). These soils formed in loamy alluvium. They are on low terraces in the Sequatchie Valley. Slopes are 0 to 2 percent.

Typical pedon of Whitwell loam, rarely flooded; 1.5 miles east of Dunlap on old Highway 28 from intersection of Rankin and Cherry Streets; 1,150 feet south of bridge; 650 feet east of Sequatchie River; (atlas sheet 11):

Ap—0 to 9 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; common very fine and fine roots; common very fine and fine tubular pores; neutral; abrupt smooth boundary.

BE—9 to 14 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; few very fine and fine roots; many very fine and fine tubular pores; moderately acid; gradual smooth boundary.

Bt1—14 to 24 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; few very fine and fine roots; common very fine and fine tubular pores; few faint clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

Bt2—24 to 40 inches; yellowish brown (10YR 5/4) clay loam; common fine and medium distinct light brownish gray (10YR 6/2) and few fine distinct brownish yellow (10YR 6/8) mottles; moderate fine

subangular blocky structure; friable; common very fine and fine pores; few faint clay films on faces of peds and in pores; strongly acid; clear wavy boundary.

CB—40 to 52 inches; light brownish gray (10YR 6/2) loam; common fine prominent brownish yellow (10YR 6/6) and few fine distinct gray (N 5/) mottles; weak coarse platy structure; firm; few fine pores; very strongly acid; gradual smooth boundary.

C—52 to 70 inches; light brownish gray (10YR 6/2) loam stratified with thin seams of sandy loam and loamy sand; few fine prominent brownish yellow (10YR 6/6) and few fine distinct gray (N 5/) mottles; massive; friable; 5 percent rounded fragments up to 1.5 inches across; very strongly acid.

Depth to bedrock is more than 60 inches. Content of rounded rock fragments ranges from 0 to 15 percent in each horizon. These soils are very strongly acid or strongly acid, but where limed the surface layer and the upper part of the subsoil are less acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. Where less than 6 inches thick it has value of 3. It is loam or silt loam.

In most pedons a horizon that is transitional in color and texture separates the A and Bt horizons. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It has mottles in shades of brown, yellow, or gray. It has mottles of chroma of 2 or less within a depth of 30 inches. It is loam or clay loam.

In most pedons a horizon that is transitional in color and texture separates the Bt and C horizons. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6, or it is mottled without a dominant matrix color. It has mottles in shades of brown, yellow, and gray. It is loam or sandy loam.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	less than 2.0
Low	2.0 to 4.0
Moderate	4.0 to 6.0
High	more than 6.0

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of

a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partly rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated

layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by

running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay

content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Low	less than 2.0 percent
Moderate	2.0 to 4.0 percent
High	more than 4.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	more than 6.0 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Prescribed burning. Deliberately burning an area for specific management purposes, under the

appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	less than 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	more than 9.0

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 3 percent
Gently sloping	2 to 6 percent
Sloping	5 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 50 percent
Very steep	50 to 75 percent

Classes for complex slopes are as follows:

Nearly level	0 to 3 percent
Undulating	2 to 6 percent
Rolling	5 to 12 percent
Hilly	12 to 20 percent
Steep	20 to 50 percent
Very steep	50 to 75 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging

between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most

favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1957-88 at Dayton, Tennessee)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	46.7	26.7	36.7	69	-3	19	4.77	2.79	6.53	8	2.6
February	52.2	29.7	41.0	76	5	28	4.65	2.56	6.48	8	2.0
March	61.9	37.1	49.5	82	15	119	6.13	3.40	8.53	9	0.4
April	73.0	45.5	59.3	88	26	283	4.80	2.64	6.70	7	0.1
May	79.9	53.6	66.8	91	35	521	4.84	2.73	6.69	8	0.0
June	86.7	61.1	73.9	97	45	717	3.51	1.92	4.90	7	0.0
July	89.2	65.2	77.2	98	54	843	4.48	2.48	6.24	8	0.0
August	88.4	64.4	76.4	97	53	818	3.92	1.88	5.67	7	0.0
September	82.4	58.7	70.6	94	41	618	4.24	1.72	6.36	6	0.0
October	72.2	46.8	59.5	87	27	307	3.36	1.50	4.97	5	0.0
November	60.5	38.2	49.4	79	16	86	4.74	2.84	6.43	7	0.0
December	50.9	31.0	41.0	71	6	38	5.35	2.71	7.64	8	0.9
Yearly:											
Average	70.3	46.5	58.4	---	---	---	---	---	---	---	---
Extreme	---	---	---	100	-4	---	---	---	---	---	---
Total	---	---	---	---	---	4,397	54.79	46.29	63.05	88	6.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1957-88 at Dayton, Tennessee)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 8	Apr. 17	Apr. 28
2 years in 10 later than--	Mar. 31	Apr. 10	Apr. 22
5 years in 10 later than--	Mar. 15	Mar. 29	Apr. 10
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 28	Oct. 23	Oct. 7
2 years in 10 earlier than--	Nov. 3	Oct. 28	Oct. 13
5 years in 10 earlier than--	Nov. 15	Nov. 7	Oct. 24

Table 3.--Growing Season

(Recorded in the period 1957-88 at Dayton, Tennessee)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	216	201	171
8 years in 10	226	209	180
5 years in 10	246	224	197
2 years in 10	268	241	216
1 year in 10	284	253	230

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AeC	Allen loam, 5 to 12 percent slopes	323	0.2
AeD	Allen loam, 12 to 20 percent slopes	294	0.2
AeE	Allen loam, 20 to 30 percent slopes	105	0.1
BaC	Barger silt loam, 6 to 12 percent slopes	261	0.2
BbB	Beersheba loam, 2 to 6 percent slopes	746	0.4
BbC	Beersheba loam, 6 to 12 percent slopes	4,321	2.5
BeD	Bethesda channery loam, 8 to 25 percent slopes	1,241	0.7
BhF	Bethesda-Pits complex, 20 to 90 percent slopes	2,752	1.6
BoD	Bodine and Pailo gravelly loams, 12 to 20 percent slopes	1,116	0.7
BoE	Bodine and Pailo gravelly loams, 20 to 50 percent slopes	4,933	2.9
Br	Bonair loam, occasionally flooded	265	0.2
BuF	Bouldin stony loam, 20 to 75 percent slopes, bouldery	16,471	9.7
CaB	Capshaw silt loam, 2 to 5 percent slopes	386	0.2
CbF	Carbo-Rock outcrop complex, 20 to 60 percent slopes	889	0.5
CoA	Cobstone cobbly fine sandy loam, 0 to 3 percent slopes, rarely flooded	1,287	0.8
CoB	Cobstone stony loam, 2 to 5 percent slopes	261	0.2
CtC2	Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded	563	0.3
CtD2	Colbert-Talbott-Braxton complex, 12 to 20 percent slopes, eroded	482	0.3
CxD	Colbert-Talbott-Rock outcrop complex, 5 to 20 percent slopes	227	0.1
EnE	Enders silt loam, 20 to 50 percent slopes	431	0.3
EtB	Etowah silt loam, 2 to 5 percent slopes	498	0.3
EtC2	Etowah silt loam, 5 to 12 percent slopes, eroded	288	0.2
FnC2	Fullerton gravelly silt loam, 5 to 15 percent slopes, eroded	312	0.2
FnE	Fullerton gravelly loam, 15 to 30 percent slopes	250	0.1
GpC	Gilpin channery silt loam, 6 to 12 percent slopes	164	0.1
GpD	Gilpin channery silt loam, 12 to 20 percent slopes	667	0.4
GpE	Gilpin channery silt loam, 20 to 45 percent slopes	4,176	2.5
GrF	Gilpin-Ramsey-Rock outcrop complex, 20 to 60 percent slopes	24,786	14.5
Ha	Hamblen loam, occasionally flooded	649	0.4
HoB	Holston loam, 2 to 5 percent slopes	936	0.6
HoC2	Holston loam, 5 to 12 percent slopes, eroded	976	0.6
JeC	Jefferson loam, 5 to 12 percent slopes	687	0.4
JeD	Jefferson loam, 12 to 20 percent slopes	2,123	1.2
JeE	Jefferson stony loam, 20 to 50 percent slopes	6,371	3.7
LaB	Lily loam, 2 to 6 percent slopes	3,037	1.8
LaC	Lily loam, 6 to 12 percent slopes	27,191	15.9
LaD	Lily loam, 12 to 20 percent slopes	15,925	9.3
LoB	Lonewood silt loam, 2 to 5 percent slopes	5,519	3.2
LoC	Lonewood silt loam, 5 to 12 percent slopes	7,362	4.3
Mn	Melvin and Newark silt loams, depressional	367	0.2
MvC	Minvale gravelly loam, 6 to 12 percent slopes	481	0.3
MvD	Minvale gravelly loam, 12 to 20 percent slopes	939	0.6
NeE	Nella stony loam, 12 to 30 percent slopes	1,340	0.8
Pt	Pits, quarries	68	*
RaC	Ramsey sandy loam, 5 to 15 percent slopes	5,288	3.1
RaE	Ramsey sandy loam, 15 to 35 percent slopes	3,371	2.0
RrE	Ramsey-Rock outcrop complex, 15 to 50 percent slopes	4,618	2.7
SaA	Sequatchie loam, 0 t0 2 percent slopes	1,530	0.9
SeA	Sequatchie loam, 0 to 2 percent slopes, rarely flooded	1,902	1.1
SeB	Sequatchie loam, 2 to 6 percent slopes	1,279	0.8
Sn	Sewanee loam, occasionally flooded	805	0.5
Su	Sullivan loam, occasionally flooded	1,954	1.1
Sw	Swafford loam, 0 to 3 percent slopes	880	0.5
TaC	Tasso loam, 5 to 12 percent slopes	573	0.3
WaB	Waynesboro loam, 2 to 6 percent slopes	505	0.3
WaC2	Waynesboro loam, 6 to 12 percent slopes, eroded	2,219	1.3
WaD2	Waynesboro loam, 12 to 20 percent slopes, eroded	494	0.3
WaD3	Waynesboro clay loam, 12 to 25 percent slopes, severely eroded	621	0.4

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
WaE2	Waynesboro loam, 20 to 30 percent slopes, eroded	299	0.2
Wh	Whitwell loam, rarely flooded	1,196	0.7
	Water	100	0.1
	Total	170,100	100.0

* Less than 0.1 percent.

Table 5.--Land Capability Classes and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
AeC Allen	IIIe	90	32	52	3.5	6.5
AeD Allen	IVe	80	28	48	3.1	6.0
AeE Allen	VIe	---	---	---	---	5.5
BaC Barger	IIIe	70	25	40	---	6.0
BbB Beersheba	IIe	90	30	50	---	7.0
BbC Beersheba	IIIe	80	25	45	---	6.5
BeD Bethesda	VIs	---	---	---	---	---
BhF** Bethesda-Pits	VIIs	---	---	---	---	---
BoD Bodine and Pailo	VIs	---	---	---	---	4.0
BoE Bodine and Pailo	VIIs	---	---	---	---	3.5
Br Bonair	IVw	---	30	---	---	6.0
BuF Bouldin	VIIs	---	---	---	---	---
CaB Capshaw	IIe	85	30	45	---	6.5
CbF** Carbo-Rock outcrop	VIIs	---	---	---	---	---
CoA Cobstone	VIs	---	---	---	---	3.5
CoB Cobstone	VIIs	---	---	---	---	---
CtC2 Colbert-Talbott-Braxton	IVe	60	---	35	---	5.0
CtD2 Colbert-Talbott-Braxton	VIe	---	---	---	---	4.0
CxD** Colbert-Talbott-Rock outcrop	VIs	---	---	---	---	3.5

See footnotes at end of table.

Table 5.--Land Capability Classes and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
EnE---- Enders	VIIe	---	---	---	---	4.0
EtB---- Etowah	IIe	110	42	58	4.2	7.5
EtC2---- Etowah	IIIe	95	35	54	3.8	7.0
FnC2---- Fullerton	IIIe	85	28	48	2.8	6.0
FnE---- Fullerton	VIe	---	---	---	---	5.0
GpC---- Gilpin	IIIe	75	---	35	---	6.0
GpD---- Gilpin	IVe	80	---	30	---	5.5
GpE---- Gilpin	VIe	---	---	---	---	4.0
GrF**---- Gilpin-Ramsey-Rock outcrop	VIIs	---	---	---	---	---
Ha---- Hamblen	IIw	115	44	---	---	8.0
HoB---- Holston	IIe	105	40	55	4.0	7.5
HoC2---- Holston	IIIe	90	30	50	3.6	6.5
JeC---- Jefferson	IIIe	95	32	50	3.8	7.0
JeD---- Jefferson	IVe	80	25	44	3.5	6.0
JeE---- Jefferson	VIIs	---	---	---	---	---
LaB---- Lily	IIe	90	32	48	---	7.0
LaC---- Lily	IIIe	80	28	42	---	6.5
LaD---- Lily	IVe	70	---	---	---	5.5
LoB---- Lonewood	IIe	95	34	50	3.5	7.5
LoC---- Lonewood	IIIe	85	30	48	3.2	7.0

See footnotes at end of table.

Table 5.--Land Capability Classes and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
Mn Melvin and Newark	Vw	---	---	---	---	4.5
MvC Minvale	IIIe	85	30	48	3.0	6.5
MvD Minvale	IVe	75	25	42	2.5	6.0
NeE Nella	VIs	---	---	---	---	5.0
Pt**. Pits, quarries						
RaC Ramsey	VIe	---	---	---	---	3.5
RaE Ramsey	VIIe	---	---	---	---	---
RrE** Ramsey-Rock outcrop	VIIs	---	---	---	---	---
SaA Sequatchie	I	115	45	60	4.5	8.0
SeA Sequatchie	I	115	45	58	4.2	8.0
SeB Sequatchie	IIe	110	42	55	4.0	7.5
Sn Sewanee	IIw	90	40	---	---	7.5
Su Sullivan	IIw	125	45	---	---	8.5
Sw Swafford	IIw	110	40	50	---	7.5
TaC Tasso	IIIe	90	3.0	50	3.0	6.5
WaB Waynesboro	IIe	105	40	55	4.0	7.5
WaC2 Waynesboro	IIIe	90	30	50	3.5	7.0
WaD2 Waynesboro	IVe	75	---	45	3.0	6.0
WaD3 Waynesboro	VIe	---	---	---	2.5	5.0
WaE2 Waynesboro	VIe	---	---	---	---	5.5

See footnotes at end of table.

Table 5.--Land Capability Classes and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
Wh---------- Whitwell	IIw	110	40	50	---	7.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 6.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
AeC--Allen	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar Shortleaf pine	87 72	86 114	Yellow-poplar, loblolly pine, shortleaf pine.
AeD, AeE--Allen	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar Shortleaf pine	87 72	86 114	Yellow-poplar, loblolly pine, shortleaf pine.
BaC--Barger	Slight	Slight	Slight	Moderate	Moderate	Southern red oak Shortleaf pine Virginia pine Eastern redcedar	70 70 70 50	57 114 114 57	Shortleaf pine, loblolly pine, Virginia pine, southern red oak.
BbB, BbC--Beersheba	Slight	Slight	Slight	Slight	Moderate	Southern red oak Virginia pine Shortleaf pine Yellow-poplar Hickory	65 65 65 85 ---	43 100 100 86 --	Shortleaf pine, Virginia pine, loblolly pine.
BeD--Bethesda	Moderate	Moderate	Severe	Slight	Moderate	Black locust	75	--	Black locust, Virginia pine.
BhF**:									
Bethesda	Severe	Severe	Severe	Slight	Moderate	Black locust	75	--	Black locust, Virginia pine.
Pits.									
BoD**:									
Bodine	Slight	Moderate	Moderate	Slight	Moderate	Southern red oak Shortleaf pine Black oak Virginia pine	65 65 65 60	43 100 43 86	Loblolly pine, shortleaf pine, Virginia pine.
Pailo	Slight	Moderate	Moderate	Slight	Moderate	Shortleaf pine Scarlet oak Chestnut oak Virginia pine	65 65 65 60	100 43 43 86	Shortleaf pine, Virginia pine, loblolly pine.
BoE**:									
Bodine	Moderate	Severe	Moderate	Slight	Moderate	Southern red oak Shortleaf pine Black oak Virginia pine	65 65 65 60	43 100 43 86	Loblolly pine, shortleaf pine, Virginia pine.
Pailo	Moderate	Severe	Moderate	Slight	Moderate	Shortleaf pine Scarlet oak Chestnut oak Virginia pine	65 65 65 60	100 43 43 86	Shortleaf pine, Virginia pine, loblolly pine.
Br--Bonair	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine Willow oak Sweetgum	90 90 90	129 86 100	Loblolly pine, willow oak.

See footnotes at end of table.

Table 6.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
BuF---------- Bouldin	Moderate	Severe	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar, shortleaf pine.
						Northern red oak----	75	57	
						Shortleaf pine------	70	114	
CaB---------- Capshaw	Slight	Slight	Slight	Moderate	--------	Yellow-poplar-------	90	86	Loblolly pine, shortleaf pine, yellow-poplar.
						Loblolly pine-------	80	114	
						Northern red oak----	70	57	
CbF**:									
Carbo----------	Severe	Severe	Slight	Moderate	Slight	Virginia pine-------	55	86	Virginia pine, northern red oak.
						Northern red oak----	65	43	
Rock outcrop.									
CoA---------- Cobstone	Slight	Slight	Moderate	Slight	Moderate	Southern red oak----	70	57	Loblolly pine, shortleaf pine.
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
CoB---------- Cobstone	Slight	Moderate	Moderate	Slight	Moderate	Southern red oak----	70	57	Loblolly pine, shortleaf pine.
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
CtC2**:									
Colbert---------	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-------	65	86	Loblolly pine, shortleaf pine, eastern redcedar.
						Shortleaf pine------	60	86	
						Eastern redcedar----	45	57	
Talbott---------	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine, shortleaf pine, eastern redcedar, Virginia pine.
						Loblolly pine-------	80	114	
						Shortleaf pine------	64	100	
						Eastern redcedar----	46	57	
Braxton---------	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	57	Eastern redcedar, loblolly pine, shortleaf pine.
						Eastern redcedar----	50	57	
						Loblolly pine-------	80	114	
CtD2**:									
Colbert---------	Moderate	Moderate	Slight	Slight	Moderate	Loblolly pine-------	65	86	Loblolly pine, shortleaf pine, eastern redcedar.
						Shortleaf pine------	60	86	
						Eastern redcedar----	45	57	
Talbott---------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine, shortleaf pine, eastern redcedar, Virginia pine.
						Loblolly pine-------	80	114	
						Shortleaf pine------	64	100	
						Eastern redcedar----	46	57	
Braxton---------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	70	57	Eastern redcedar, loblolly pine, shortleaf pine.
						Eastern redcedar----	50	57	
						Loblolly pine-------	80	114	

See footnotes at end of table.

Table 6.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
CxD**:									
Colbert	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	65	86	Loblolly pine, shortleaf pine, eastern redcedar.
						Shortleaf pine	60	86	
						Eastern redcedar	45	57	
Talbott	Slight	Slight	Slight	Slight	Moderate	Northern red oak	65	43	Loblolly pine, shortleaf pine, eastern redcedar, Virginia pine.
						Loblolly pine	80	114	
						Shortleaf pine	64	100	
						Eastern redcedar	46	57	
Rock outcrop.									
EnE	Severe	Severe	Slight	Slight	Moderate	Shortleaf pine	60	86	Shortleaf pine, eastern redcedar, loblolly pine.
Enders						Southern red oak	60	43	
						White oak	55	43	
						Eastern redcedar	40	43	
EtB	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, loblolly pine.
Etowah						Southern red oak	80	57	
						Loblolly pine	90	129	
						Shortleaf pine	80	129	
EtC2	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, loblolly pine.
Etowah						Southern red oak	80	57	
						Loblolly pine	90	129	
						Shortleaf pine	80	129	
FnC2	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, loblolly pine.
Fullerton						Southern red oak	70	57	
						Shortleaf pine	67	100	
FnE	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, loblolly pine.
Fullerton						Southern red oak	70	57	
						Shortleaf pine	67	100	
GpC	Slight	Slight	Slight	Slight	Moderate	Northern red oak	80	57	Virginia pine, eastern white pine, shortleaf pine, yellow-poplar.
Gilpin						Yellow-poplar	95	100	
GpD, GpE	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	80	57	Japanese larch, Virginia pine, eastern white pine, shortleaf pine, yellow-poplar.
Gilpin						Yellow-poplar	95	100	
GrF**:									
Gilpin	Severe	Severe	Slight	Slight	Moderate	Northern red oak	80	57	Japanese larch, Virginia pine, eastern white pine, shortleaf pine, yellow-poplar.
						Yellow-poplar	95	100	

See footnotes at end of table.

Table 6.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
GrF**:									
Ramsey	Severe	Severe	Moderate	Severe	Slight	Shortleaf pine	59	86	Shortleaf pine, Virginia pine, loblolly pine.
						White oak	61	43	
						Virginia pine	60	86	
Rock outcrop.									
Ha	Slight	Slight	Slight	Slight	Severe	Yellow-poplar	100	114	Loblolly pine, yellow-poplar.
Hamblen						Northern red oak	80	57	
						Loblolly pine	90	129	
HoB, HoC2	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	86	86	Yellow-poplar, loblolly pine.
Holston						Northern red oak	78	57	
						Shortleaf pine	69	114	
JeC	Slight	Slight	Slight	Slight	Moderate	Northern red oak	85	57	Yellow-poplar, eastern white pine, shortleaf pine.
Jefferson						Yellow-poplar	98	114	
						White oak	80	57	
JeD	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	85	4	Yellow-poplar, eastern white pine, shortleaf pine.
Jefferson						Yellow-poplar	108	8	
						White oak	88	57	
JeE	Severe	Severe	Slight	Slight	Moderate	Northern red oak	85	57	Yellow-poplar, eastern white pine, shortleaf pine.
Jefferson						Yellow-poplar	108	114	
						White oak	---	57	
LaB, LaC	Slight	Slight	Slight	Slight	Moderate	Shortleaf pine	63	100	Shortleaf pine, white oak, eastern white pine, loblolly pine, northern red oak.
Lily						Virginia pine	70	114	
						Black oak	78	57	
						White oak	73	57	
						Yellow-poplar	95	--	
						Northern red oak	78	--	
LaD	Moderate	Moderate	Slight	Slight	Moderate	Shortleaf pine	63	100	Shortleaf pine, white oak, eastern white pine, loblolly pine, northern red oak.
Lily						Virginia pine	70	114	
						Black oak	78	57	
						White oak	73	57	
						Yellow-poplar	95	100	
						Northern red oak	78	57	
LoB, LoC	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	80	114	Loblolly pine, shortleaf pine, Virginia pine, eastern white pine.
Lonewood						Shortleaf pine	70	114	
						Virginia pine	70	114	
						White oak	75	57	
						Eastern white pine	80	143	

See footnotes at end of table.

Table 6.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
Mn**:									
Melvin	Slight	Severe	Severe	Severe	Severe	Pin oak	90	86	Sweetgum, pin oak, cherrybark oak.
Newark	Slight	Severe	Severe	Severe	Severe	Pin oak	90	86	Sweetgum, pin oak, cherrybark oak.
MvC	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, black walnut, loblolly pine.
Minvale						White oak	70	57	
						Shortleaf pine	70	114	
						Loblolly pine	80	114	
						Virginia pine	70	114	
MvD	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, black walnut, loblolly pine.
Minvale						White oak	70	57	
						Shortleaf pine	70	114	
						Loblolly pine	80	114	
						Virginia pine	70	114	
NeE	Slight	Moderate	Slight	Slight	Moderate	Yellow-poplar	96	100	Yellow-poplar, loblolly pine, shortleaf pine, Virginia pine.
Nella						Shortleaf pine	70	114	
						Virginia pine	70	114	
						Southern red oak	70	57	
RaC	Slight	Slight	Moderate	Severe	Slight	Shortleaf pine	59	86	Shortleaf pine, Virginia pine, loblolly pine.
Ramsey						White oak	61	43	
						Virginia pine	60	86	
RaE	Moderate	Moderate	Moderate	Severe	Slight	Shortleaf pine	59	86	Shortleaf pine, Virginia pine, loblolly pine.
Ramsey						White oak	61	43	
						Virginia pine	59	86	
RrE**:									
Ramsey	Moderate	Moderate	Moderate	Severe	Slight	Shortleaf pine	59	86	Shortleaf pine, Virginia pine, loblolly pine.
						White oak	61	43	
						Virginia pine	59	86	
Rock outcrop.									
SaA	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	100	114	Yellow-poplar, black walnut, loblolly pine.
Sequatchie						White oak	80	57	
						Loblolly pine	90	129	
SeA, SeB	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	100	114	Yellow-poplar, black walnut, loblolly pine.
Sequatchie						White oak	80	57	
						Loblolly pine	90	129	

See footnotes at end of table.

Table 6.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
Sn--- Sewanee	Slight	Moderate	Slight	Slight	Severe	Yellow-poplar	100	114	Loblolly pine, yellow-poplar, eastern white pine.
						Loblolly pine	85	114	
						Southern red oak	80	57	
						Shortleaf pine	80	129	
						Sweetgum	90	100	
						Eastern white pine	90	172	
Su--- Sullivan	Slight	Slight	Slight	Slight	Severe	Yellow-poplar	100	114	Yellow-poplar, black walnut, loblolly pine.
						Northern red oak	70	57	
						Shortleaf pine	70	114	
						Virginia pine	70	114	
Sw--- Swafford	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	95	100	Yellow-poplar, loblolly pine, sweetgum.
						Northern red oak	75	57	
						Sweetgum	90	100	
TaC--- Tasso	Slight	Slight	Slight	Slight	Moderate	Southern red oak	70	57	Loblolly pine, shortleaf pine, Virginia pine.
						Yellow-poplar	90	86	
						White oak	70	57	
						Shortleaf pine	70	114	
						Virginia pine	70	114	
WaB, WaC2--- Waynesboro	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, shortleaf pine, loblolly pine, black walnut.
						Southern red oak	70	57	
						White oak	70	57	
						Loblolly pine	80	114	
WaD2, WaD3, WaE2--- Waynesboro	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, shortleaf pine, loblolly pine, black walnut.
						Southern red oak	70	57	
						White oak	70	57	
						Loblolly pine	80	114	
Wh--- Whitwell	Slight	Slight	Slight	Slight	Severe	Yellow-poplar	95	100	Loblolly pine, eastern white pine, sweetgum.
						Northern red oak	75	57	
						Sweetgum	90	100	
						Loblolly pine	90	129	
						Eastern white pine	90	172	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 7.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AeC Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
AeD Allen	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
AeE Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BaC Barger	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, droughty, slope.
BbB Beersheba	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: depth to rock.
BbC Beersheba	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
BeD Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
BhF*: Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
Pits.					
BoD*: Bodine	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, slope.
Pailo	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
BoE*: Bodine	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Pailo	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Br Bonair	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

Table 7.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BuF Bouldin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CaB Capshaw	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
CbF*: Carbo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rock outcrop.					
CoA Cobstone	Severe: flooding.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
CoB Cobstone	Moderate: large stones.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
CtC2*: Colbert	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight	Moderate: slope.
Talbott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Braxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
CtD2*: Colbert	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Moderate: slope.	Severe: slope.
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Braxton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CxD*: Colbert	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Talbott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Rock outcrop.					
EnE Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 7.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EtB---- Etowah	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
EtC2---- Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FnC2---- Fullerton	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
FnE---- Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
GpC---- Gilpin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Moderate: large stones.	Moderate: slope, small stones.
GpD---- Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, large stones.	Severe: slope.
GpE---- Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
GrF*:					
Gilpin----	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Ramsey----	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop.					
Ha---- Hamblen	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
HoB---- Holston	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
HoC2---- Holston	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
JeC---- Jefferson	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
JeD---- Jefferson	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
JeE---- Jefferson	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 7.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LaB---- Lily	Slight	Slight	Moderate: slope, depth to rock.	Slight	Moderate: depth to rock.
LaC---- Lily	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
LaD---- Lily	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
LoB---- Lonewood	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
LoC---- Lonewood	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Mn*:					
Melvin----	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Newark----	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
MvC---- Minvale	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
MvD---- Minvale	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
NeE---- Nella	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: large stones, slope.	Severe: slope.
Pt*. Pits, quarries					
RaC---- Ramsey	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
RaE---- Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
RrE*:					
Ramsey----	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop.					
SaA---- Sequatchie	Slight	Slight	Moderate: small stones.	Slight	Moderate: large stones.
SeA---- Sequatchie	Severe: flooding.	Slight	Moderate: small stones.	Slight	Moderate: large stones.

See footnote at end of table.

Table 7.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SeB---------- Sequatchie	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: large stones.
Sn---------- Sewanee	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Su---------- Sullivan	Severe: flooding.	Slight----------	Moderate: small stones, flooding.	Slight----------	Moderate: flooding.
Sw---------- Swafford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Slight----------	Slight.
TaC---------- Tasso	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WaB---------- Waynesboro	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
WaC2---------- Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
WaD2, WaD3---------- Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WaE2---------- Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wh---------- Whitwell	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Slight----------	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 8.--Wildlife Habitat

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AeC---- Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AeD---- Allen	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AeE---- Allen	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BaC---- Barger	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BbB---- Beersheba	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BbC---- Beersheba	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BeD---- Bethesda	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
BhF*: Bethesda----	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Pits.										
BoD*: Bodine----	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Pailo----	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BoE*: Bodine----	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Pailo----	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Br---- Bonair	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
BuF---- Bouldin	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CaB---- Capshaw	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CbF*: Carbo----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										

See footnote at end of table.

Table 8.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CoA---------- Cobstone	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CoB---------- Cobstone	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
CtC2*:										
Colbert----------	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Talbott----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Braxton----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CtD2*:										
Colbert----------	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Talbott----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Braxton----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CxD*:										
Colbert----------	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Talbott----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop.										
EnE---------- Enders	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
EtB---------- Etowah	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtC2---------- Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FnC2---------- Fullerton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FnE---------- Fullerton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GpC---------- Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
GpD---------- Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
GpE---------- Gilpin	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

Table 8.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GrF*:										
Gilpin	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ramsey	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop.										
Ha	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Hamblen										
HoB	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Holston										
HoC2	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Holston										
JeC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Jefferson										
JeD	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Jefferson										
JeE	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Jefferson										
LaB	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Lily										
LaC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Lily										
LaD	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lily										
LoB	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Lonewood										
LoC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Lonewood										
Mn*:										
Melvin	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Newark	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
MvC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Minvale										
MvD	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Minvale										
NeE	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Nella										
Pt*.										
Pits, quarries										

See footnote at end of table.

Table 8.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
RaC, RaE---------- Ramsey	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
RrE*: Ramsey----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.										
SaA---------- Sequatchie	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SeA, SeB---------- Sequatchie	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sn---------- Sewanee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Su---------- Sullivan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sw---------- Swafford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TaC---------- Tasso	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaB---------- Waynesboro	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaC2---------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaD2, WaD3--------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaE2---------- Waynesboro	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Wh---------- Whitwell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 9.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AeC---------- Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AeD, AeE---------- Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BaC---------- Barger	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, droughty, slope.
BbB---------- Beersheba	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Slight---------	Moderate: depth to rock.
BbC---------- Beersheba	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope, depth to rock.
BeD---------- Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
BhF*: Bethesda---------	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
Pits.						
BoD*, BoE*: Bodine----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Pailo----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Br---------- Bonair	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
BuF---------- Bouldin	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
CaB---------- Capshaw	Moderate: depth to rock, too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.

See footnote at end of table.

Table 9.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CbF*:						
Carbo	Severe: slope, depth to rock.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Rock outcrop.						
CoA	Moderate: large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe: large stones.
Cobstone						
CoB	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Severe: large stones.
Cobstone						
CtC2*:						
Colbert	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
Talbott	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
Braxton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
CtD2*:						
Colbert	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
Talbott	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Braxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CxD*:						
Colbert	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
Talbott	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
Rock outcrop.						
EnE	Severe: slope, slippage.	Severe: shrink-swell, slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, slope, slippage.	Severe: shrink-swell, low strength, slope.	Severe: slope.
Enders						

See footnote at end of table.

Table 9.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EtB Etowah	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
EtC2 Etowah	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
FnC2 Fullerton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Severe: small stones.
FnE Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
GpC Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
GpD, GpE Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GrF*: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Ramsey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop.						
Ha Hamblen	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
HoB Holston	Slight	Slight	Slight	Slight	Slight	Slight.
HoC2 Holston	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
JeC Jefferson	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
JeD, JeE Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LaB Lily	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: depth to rock.
LaC Lily	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: slope, depth to rock.

See footnote at end of table.

Table 9.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LaD--- Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
LoB--- Lonewood	Moderate: depth to rock.	Slight---	Moderate: depth to rock.	Slight---	Severe: low strength.	Slight.
LoC--- Lonewood	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
Mn*: Melvin---	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.
Newark---	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
MvC--- Minvale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
MvD--- Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
NeE--- Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt*. Pits, quarries						
RaC--- Ramsey	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
RaE--- Ramsey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
RrE*: Ramsey---	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop.						
SaA--- Sequatchie	Slight---	Slight---	Slight---	Slight---	Slight---	Moderate: large stones.
SeA--- Sequatchie	Slight---	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: large stones.
SeB--- Sequatchie	Slight---	Slight---	Slight---	Moderate: slope.	Slight---	Moderate: large stones.

See footnote at end of table.

Table 9.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Sn---------- Sewanee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
Su---------- Sullivan	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Sw---------- Swafford	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
TaC---------- Tasso	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WaB---------- Waynesboro	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
WaC2---------- Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WaD2, WaD3, WaE2-- Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wh---------- Whitwell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 10.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AeC Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AeD, AeE Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
BaC Barger	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
BbB Beersheba	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
BbC Beersheba	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
BeD Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
BhF*: Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
Pits.					
BoD*, BoE*: Bodine	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Pailo	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: slope, too clayey.	Severe: seepage, slope.	Poor: small stones, slope.
Br Bonair	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: wetness.
BuF Bouldin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.

See footnote at end of table.

Table 10.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CaB---------- Capshaw	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
CbF*:					
Carbo----------	Severe: depth to rock, percs slowly, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Rock outcrop.					
CoA---------- Cobstone	Moderate: flooding, large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones.
CoB---------- Cobstone	Moderate: large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones.
CtC2*:					
Colbert----------	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Talbott----------	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Braxton----------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
CtD2*:					
Colbert----------	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Talbott----------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Braxton----------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
CxD*:					
Colbert----------	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Talbott----------	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.

See footnote at end of table.

Table 10.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CxD*: Rock outcrop.					
EnE--- Enders	Severe: percs slowly, slope, slippage.	Severe: slope, slippage.	Severe: depth to rock, slope, too clayey.	Severe: slope, slippage.	Poor: too clayey, hard to pack, slope.
EtB--- Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight---	Fair: too clayey.
EtC2--- Etowah	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey.
FnC2--- Fullerton	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
FnE--- Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
GpC--- Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GpD, GpE--- Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
GrF*: Gilpin---	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Ramsey---	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Rock outcrop.					
Ha--- Hamblen	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
HoB--- Holston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight---	Fair: too clayey, small stones.
HoC2--- Holston	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.

See footnote at end of table.

Table 10.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
JeC---------- Jefferson	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones, slope.
JeD, JeE---------- Jefferson	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
LaB---------- Lily	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
LaC---------- Lily	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
LaD---------- Lily	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
LoB---------- Lonewood	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
LoC---------- Lonewood	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
Mn*:					
Melvin----------	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
Newark----------	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
MvC---------- Minvale	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones.
MvD---------- Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
NeE---------- Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Pt*. Pits, quarries					
RaC---------- Ramsey	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.

See footnote at end of table.

Table 10.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RaE---------- Ramsey	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
RrE*: Ramsey----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Rock outcrop.					
SaA---------- Sequatchie	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight----------	Fair: too clayey, small stones.
SeA---------- Sequatchie	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: flooding.	Fair: too clayey, small stones.
SeB---------- Sequatchie	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight----------	Fair: too clayey, small stones.
Sn---------- Sewanee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: wetness.
Su---------- Sullivan	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
Sw---------- Swafford	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
TaC---------- Tasso	Severe: percs slowly.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Fair: too clayey, slope.
WaB---------- Waynesboro	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
WaC2---------- Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
WaD2, WaD3, WaE2---- Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wh---------- Whitwell	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 11.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AeC--Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AeD--Allen	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AeE--Allen	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BaC--Barger	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BbB--Beersheba	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey.
BbC--Beersheba	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, slope.
BeD--Bethesda	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BhF*:				
Bethesda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Pits.				
BoD*:				
Bodine	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pailo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BoE*:				
Bodine	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pailo	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

Table 11.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Br Bonair	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BuF Bouldin	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
CaB Capshaw	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CbF*: Carbo	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				
CoA, CoB Cobstone	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim.
CtC2*: Colbert	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Braxton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CtD2*: Colbert	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Braxton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CxD*: Colbert	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				

See footnote at end of table.

Table 11.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EnE---- Enders	Poor: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
EtB---- Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
EtC2---- Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
FnC2---- Fullerton	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
FnE---- Fullerton	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
GpC---- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GpD---- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GpE---- Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GrF*:				
Gilpin----	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Ramsey----	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
Ha---- Hamblen	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
HoB, HoC2---- Holston	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
JeC---- Jefferson	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

Table 11.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
JeD--- Jefferson	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
JeE--- Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
LaB, LaC--- Lily	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
LaD--- Lily	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
LoB--- Lonewood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
LoC--- Lonewood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Mn*:				
Melvin---	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Newark---	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MvC--- Minvale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MvD--- Minvale	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
NeE--- Nella	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pt*. Pits, quarries				
RaC--- Ramsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
RaE--- Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

Table 11.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RrE*:				
Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
SaA Sequatchie	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
SeA, SeB Sequatchie	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Sn Sewanee	Fair: depth to rock, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Moderate: small stones.
Su Sullivan	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Sw Swafford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
TaC Tasso	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
WaB, WaC2 Waynesboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WaD2, WaD3 Waynesboro	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
WaE2 Waynesboro	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Wh Whitwell	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 12.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AeC, AeD---------- Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
AeE---------- Allen	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
BaC---------- Barger	Severe: slope.	Moderate: seepage, piping, wetness.	Percs slowly, slope.	Slope, wetness, droughty.	Slope, erodes easily, wetness.	Slope, erodes easily, droughty.
BbB---------- Beersheba	Severe: seepage.	Severe: piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
BbC---------- Beersheba	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
BeD---------- Bethesda	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, slippage.	Large stones, slope, droughty.
BhF*: Bethesda---------	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, slippage.	Large stones, slope, droughty.
Pits.						
BoD*, BoE*: Bodine----------	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
Pailo----------	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, droughty.	Slope, large stones.	Large stones, slope, droughty.
Br---------- Bonair	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Flooding-------	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
BuF---------- Bouldin	Severe: seepage, slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
CaB---------- Capshaw	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
CbF*: Carbo----------	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

See footnote at end of table.

Table 12.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CbF*: Rock outcrop.						
CoA---------- Cobstone	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Large stones---	Large stones, droughty.
CoB---------- Cobstone	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Large stones---	Large stones, droughty.
CtC2*, CtD2*:						
Colbert----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
Talbott----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Braxton----------	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
CxD*:						
Colbert----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Talbott----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
EnE---------- Enders	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
EtB---------- Etowah	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
EtC2---------- Etowah	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
FnC2, FnE--------- Fullerton	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
GpC, GpD, GpE----- Gilpin	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
GrF*:						
Gilpin----------	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Ramsey----------	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty.

See footnote at end of table.

Table 12.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
GrF*: Rock outcrop.						
Ha---------- Hamblen	Moderate: seepage.	Severe: piping.	Flooding-------	Wetness, flooding.	Wetness---------	Favorable.
HoB---------- Holston	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
HoC2---------- Holston	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
JeC, JeD---------- Jefferson	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Slope, soil blowing.	Slope.
JeE---------- Jefferson	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
LaB---------- Lily	Severe: seepage.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
LaC, LaD---------- Lily	Severe: seepage.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
LoB---------- Lonewood	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
LoC---------- Lonewood	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Mn*: Melvin----------	Moderate: seepage.	Severe: piping, ponding.	Ponding, flooding.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
Newark----------	Moderate: seepage.	Severe: piping, ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding---------	Wetness.
MvC, MvD---------- Minvale	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
NeE---------- Nella	Severe: slope.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Pt*. Pits, quarries						
RaC, RaE---------- Ramsey	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.

See footnote at end of table.

Table 12.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
RrE*:						
Ramsey	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
SaA---------- Sequatchie	Severe: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
SeA---------- Sequatchie	Severe: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
SeB---------- Sequatchie	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
Sn---------- Sewanee	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
Su---------- Sullivan	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
Sw---------- Swafford	Moderate: seepage.	Severe: piping.	Favorable------	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
TaC---------- Tasso	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
WaB---------- Waynesboro	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
WaC2, WaD2, WaD3, WaE2---------- Waynesboro	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Wh---------- Whitwell	Moderate: seepage.	Severe: piping.	Favorable------	Wetness--------	Wetness--------	Favorable.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 13.--Engineering Index Properties

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
AeC--- Allen	0-12	Loam---	ML, CL-ML, SM, SC-SM	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	12-62	Clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
AeD--- Allen	0-16	Loam---	ML, CL-ML, SM, SC-SM	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	16-65	Clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
AeE--- Allen	0-15	Loam---	ML, CL-ML, SM, SC-SM	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	15-72	Clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
BaC--- Barger	0-5	Silt loam---	ML, CL-ML	A-4	0	80-95	75-90	65-85	50-75	20-35	1-10
	5-19	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	80-95	75-90	70-90	55-80	25-40	3-15
	19-23	Very gravelly loam, very gravelly clay loam.	GM, GC, ML, CL	A-4, A-6, A-2	0-5	50-75	40-65	35-55	30-55	25-40	3-15
	23-63	Very gravelly loam, very gravelly clay loam, extremely gravelly loam.	GM, GC	A-4, A-6, A-2, A-1	2-10	35-65	25-55	25-50	20-45	25-40	3-15
BbB--- Beersheba	0-9	Loam---	ML, CL-ML	A-4	0-2	90-100	85-100	75-95	51-85	<35	NP-10
	9-33	Loam, clay loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-2	85-100	85-100	75-100	40-75	20-40	3-18
	33-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
BbC--- Beersheba	0-8	Loam---	ML, CL-ML	A-4	0-2	90-100	85-100	75-95	51-85	<35	NP-10
	8-31	Loam, clay loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-2	85-100	85-100	75-100	40-75	20-40	3-18
	31-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
BeD--- Bethesda	0-10	Channery loam---	ML, GM, GM-GC, CL-ML	A-4, A-6	0-15	65-90	55-80	50-80	35-75	25-40	4-14
	10-65	Extremely channery clay loam, very channery silty clay loam, channery clay loam.	GM-GC, ML, CL, GM	A-4, A-6, A-7, A-2	10-30	45-80	25-65	25-65	20-60	24-50	3-23

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
BhF*:											
Bethesda	0-2	Very channery loam.	ML, GM, GM-GC, CL-ML	A-4, A-6	0-15	50-90	55-80	50-80	35-75	25-40	4-14
	2-70	Very channery clay loam, extremely channery silty clay loam, extremely channery clay loam.	GM-GC, ML, CL, GM	A-4, A-6, A-7, A-2	10-30	45-80	25-65	25-65	20-60	24-50	3-23
Pits.											
BoD*:											
Bodine	0-18	Gravelly loam	ML, CL-ML, GM, SM	A-4, A-2, A-1-B	0-10	30-90	20-75	20-67	20-62	<30	NP-7
	18-27	Very gravelly silt loam, gravelly loam.	GM-GC, GC, SC, SC-SM	A-1, A-2, A-4, A-6	10-35	30-70	20-65	20-55	15-45	20-38	3-15
	27-63	Very gravelly silty clay loam, extremely gravelly clay loam, very gravelly silt loam.	GC, GM, GC, SM	A-2	10-35	20-70	15-65	15-45	12-35	26-42	8-16
Pailo	0-15	Gravelly loam	GM, SM	A-1-B, A-2, A-4	5-10	50-75	45-65	25-55	15-40	<30	NP-6
	15-29	Very gravelly loam, extremely gravelly loam, very gravelly sandy clay loam.	GM, GM-GC, GC, SM	A-1-B, A-2, A-4, A-6	5-25	30-65	25-55	20-45	15-40	20-35	3-12
	29-32	Sandy clay loam, clay loam, sandy clay.	CL, ML, SC, SM	A-6, A-7	0-3	85-100	80-95	60-90	36-75	35-45	12-20
	32-65	Clay	CH, MH	A-7	0-3	85-100	80-95	75-95	65-90	51-75	25-40
BoE*:											
Bodine	0-16	Gravelly loam	ML, CL-ML, GM, SM	A-4, A-2, A-1-B	0-10	30-90	20-75	20-67	20-62	<30	NP-7
	16-37	Gravelly loam, extremely gravelly loam.	GM-GC, GC, SC, SC-SM	A-1, A-2, A-4, A-6	10-35	30-70	20-65	20-55	15-45	20-38	3-15
	37-65	Very gravelly silty clay loam, extremely gravelly clay loam, very gravelly silt loam.	GC, GM, GC, SM	A-2	10-35	20-70	15-65	15-45	12-35	26-42	8-16

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
BoE*:											
Pailo	0-12	Gravelly loam	GM, SM	A-1-B, A-2, A-4	5-10	50-75	45-65	25-55	15-40	<30	NP-6
	12-27	Very gravelly loam, extremely gravelly loam, very gravelly sandy clay loam.	GM, GM-GC, GC, SM	A-1-B, A-2, A-4, A-6	5-25	30-65	25-55	20-45	15-40	20-35	3-12
	27-31	Sandy clay loam, clay loam, sandy clay.	CL, ML, SC, SM	A-6, A-7	0-3	85-100	80-95	60-90	36-75	35-45	12-20
	31-67	Clay	CH, MH	A-7	0-3	85-100	80-95	75-95	65-90	51-75	25-40
Br	0-9	Loam	ML, CL-ML, CL	A-4	0	95-100	90-100	70-95	55-85	16-25	2-8
Bonair	9-49	Silt loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-95	55-80	20-32	5-12
	49-64	Fine sandy loam, loam, silt loam.	CL-ML, CL, SC-SM, SC	A-4, A-6	0-5	90-100	85-100	70-90	40-80	17-32	4-12
BuF	0-20	Stony loam	SM, ML, SC-SM, GM	A-2, A-4	10-30	65-85	55-85	40-65	30-55	15-25	2-7
Bouldin	20-70	Very stony clay loam, very stony sandy clay loam, very stony loam.	GC, SC	A-2, A-4, A-6	30-55	55-75	45-65	35-60	25-50	25-39	8-16
CaB	0-9	Silt loam	ML, CL, CL-ML	A-4	0	90-100	85-100	80-95	75-85	18-30	3-10
Capshaw	9-20	Silty clay loam, silty clay, silt loam.	ML, CL	A-6, A-7	0	90-100	85-100	80-95	75-85	30-45	11-20
	20-52	Clay, silty clay, silty clay loam.	CL, CH, MH	A-7	0	90-100	85-100	80-95	75-90	41-68	18-36
	52-60	Clay, silty clay loam, clay loam.	MH, CH, CL	A-7	0-3	85-100	80-100	75-95	70-90	41-68	18-36
CbF*:											
Carbo	0-5	Silt loam	CL	A-6, A-7	0-2	95-100	90-100	85-95	75-85	30-50	10-25
	5-30	Clay	CH	A-7	0-5	95-100	85-100	80-95	70-90	60-80	35-55
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CoA	0-10	Cobbly fine sandy loam.	SM, SC-SM	A-4, A-2	20-35	75-85	65-80	50-70	30-50	<25	NP-6
Cobstone	10-70	Very cobbly loam, extremely cobbly sandy clay loam, very cobbly sandy loam.	GM-GC, SC-SM, SM, GM	A-4, A-2	35-50	55-85	40-80	35-70	25-55	18-30	3-10

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
CoB----------	0-9	Stony loam-------	SM, SC-SM	A-4, A-2	25-45	75-85	65-80	50-70	30-50	<25	NP-6
Cobstone	9-35	Very cobbly loam, extremely cobbly sandy clay loam, extremely cobbly sandy loam.	GM-GC, SC-SM, SM, GM	A-4, A-2	35-50	55-85	40-80	35-70	25-55	18-30	3-10
	35-60	Extremely cobbly loam, extremely cobbly fine sandy loam, very cobbly sandy loam.	SM, SC-SM, GM, GM-GC	A-4, A-2, A-1	40-55	50-75	35-70	25-60	15-45	<25	NP-6
CtC2*:											
Colbert----------	0-7	Silty clay loam	CL	A-4, A-6, A-7	0	95-100	90-100	80-100	80-95	25-45	7-25
	7-24	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	0	95-100	95-100	85-100	80-100	35-68	15-35
	24-41	Silty clay, clay	MH, CH	A-7	0	95-100	90-100	90-100	80-100	50-85	25-50
	41-52	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-3	90-100	85-100	75-95	60-90	40-70	25-50
	52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Talbott----------	0-5	Silty clay loam	CL, CH	A-6, A-7	0-5	95-100	90-100	85-95	80-95	35-60	12-32
	5-37	Clay, silty clay	CL, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Braxton----------	0-7	Silt loam--------	CL	A-4, A-6	0	80-100	75-100	70-90	65-85	25-40	7-18
	7-34	Clay, silty clay	CL, CH	A-7	0	80-100	75-100	65-95	60-90	45-62	20-32
	34-67	Clay----------	CL, CH	A-7	0	80-100	75-100	65-95	60-90	45-65	22-34
CtD2*:											
Colbert----------	0-5	Silty clay loam	CL	A-4, A-6, A-7	0	95-100	90-100	80-100	80-95	25-45	7-25
	5-21	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	0	95-100	95-100	85-100	80-100	35-68	15-35
	21-38	Silty clay, clay	MH, CH	A-7	0	95-100	90-100	90-100	80-100	50-85	25-50
	38-46	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-3	90-100	85-100	75-95	60-90	40-70	25-50
	46	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Talbott----------	0-5	Silty clay loam	CL, CH	A-6, A-7	0-5	95-100	90-100	85-95	80-95	35-60	12-32
	5-29	Clay, silty clay	CL, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Braxton----------	0-6	Silt loam--------	CL	A-4, A-6	0	80-100	75-100	70-90	65-85	25-40	7-18
	6-31	Clay, silty clay	CL, CH	A-7	0	80-100	75-100	65-95	60-90	45-62	20-32
	31-63	Clay----------	CL, CH	A-7	0	80-100	75-100	65-95	60-90	45-65	22-34

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
CxD*:											
Colbert	0-5	Silt loam	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-90	<20	NP-15
	5-25	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	0	95-100	95-100	85-100	80-100	35-68	15-35
	25-44	Silty clay, clay	MH, CH	A-7	0	95-100	90-100	90-100	80-100	50-85	25-50
	44-49	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-3	90-100	85-100	75-95	60-90	40-70	25-50
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Talbott	0-5	Silt loam	CL	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	5-35	Clay, silty clay	CL, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
EnE	0-5	Silt loam	CL, SC, SC-SM, CL-ML	A-4, A-6	0-5	80-100	75-100	65-100	40-70	20-35	5-14
Enders											
	5-9	Clay loam, silty clay loam.	CL, SC	A-6, A-7	0	80-100	50-100	45-100	35-95	35-50	15-27
	9-38	Silty clay, clay, channery clay.	CH, CL, SC	A-7	0	95-100	50-100	45-100	35-95	40-65	20-40
	38-50	Silty clay, very channery silty clay, channery clay.	CH, CL, SC, GC	A-7, A-2	0-10	55-100	25-90	25-90	20-90	45-65	25-40
	50-55	Weathered bedrock	---	---	---	---	---	---	---	---	---
EtB	0-9	Silt loam	ML, CL, SC-SM, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
Etowah											
	9-32	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	32-72	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25
EtC2	0-9	Silt loam	ML, CL, SC-SM, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
Etowah											
	9-30	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	30-65	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25
FnC2	0-8	Gravelly silt loam.	GM-GC, CL-ML, CL, GC	A-2, A-4	2-15	60-94	45-80	40-75	30-70	18-30	3-10
Fullerton											
	8-12	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	12-63	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
FnE---------- Fullerton	0-15	Gravelly loam----	GM-GC, CL-ML, CL, GC	A-2, A-4	2-15	60-94	45-80	40-75	30-70	18-30	3-10
	15-21	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	21-72	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
GpC---------- Gilpin	0-10	Channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	10-24	Channery loam, channery silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	24-30	Channery loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	30-45	Weathered bedrock.	---	---	---	---	---	---	---	---	---
GpD---------- Gilpin	0-10	Channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	10-25	Channery loam, channery silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	25-31	Channery loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	31-45	Weathered bedrock.	---	---	---	---	---	---	---	---	---
GpE---------- Gilpin	0-11	Channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	11-25	Channery loam, channery silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	25-34	Channery loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	34-45	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
GrF*:											
Gilpin	0-3	Stony silt loam	GC, CL, SC, CL-ML	A-2, A-4, A-6	2-10	50-90	45-85	35-75	30-70	20-40	4-15
	3-28	Channery silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-5	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-33	Channery loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-5	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	33-45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ramsey	0-4	Stony loam	SM, CL-ML, ML, SC-SM	A-4, A-2	5-15	75-90	65-85	50-75	30-65	<25	NP-7
	4-14	Stony loam, stony sandy loam, stony fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	5-15	75-90	65-85	50-75	34-65	<25	NP-7
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Ha	0-9	Loam	CL, CL-ML, ML	A-4, A-6	0-2	90-100	80-100	65-95	55-85	22-38	3-14
Hamblen	9-44	Silt loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6	0-2	80-100	75-100	60-95	55-85	22-40	3-17
	44-65	Silt loam, loam, clay loam.	CL, CL-ML, ML, GC	A-4, A-6, A-2	0-5	55-100	45-95	35-90	30-80	22-40	3-17
HoB	0-9	Loam	ML, CL-ML, SM, SC-SM	A-4, A-2	0-5	80-100	75-100	65-100	30-75	<22	NP-6
Holston	9-70	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SC-SM	A-4, A-2	0-5	80-100	75-100	50-100	30-80	21-33	3-10
HoC2	0-8	Loam	ML, CL-ML, SM, SC-SM	A-4, A-2	0-5	80-100	75-100	65-100	30-75	<22	NP-6
Holston	8-65	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SC-SM	A-4, A-2	0-5	80-100	75-100	50-100	30-80	21-33	3-10
JeC	0-6	Loam	SM, SC, ML, CL	A-2, A-4	0-5	85-95	80-90	40-80	25-65	20-35	2-10
Jefferson	6-61	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	0-5	75-90	50-90	50-80	30-70	15-35	2-15
JeD	0-6	Loam	SM, SC, ML, CL	A-2, A-4	0-5	85-95	80-90	40-80	25-65	20-35	2-10
Jefferson	6-63	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	0-5	75-90	50-90	50-80	30-70	15-35	2-15

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
JeE---------- Jefferson	0-11	Stony loam-------	SM, GM, ML, CL	A-4	5-20	65-90	60-90	50-80	40-60	25-35	2-10
	11-54	Stony loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	54-65	Very stony loam, grvelly clay loam, gravelly sandy clay loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	5-25	55-75	50-75	35-70	20-60	20-35	2-10
LaB---------- Lily	0-5	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	5-31	Clay loam, sandy clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LaC---------- Lily	0-7	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	7-30	Clay loam, sandy clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LaD---------- Lily	0-4	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	4-31	Clay loam, sandy clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LoB---------- Lonewood	0-11	Silt loam--------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	75-90	18-26	3-9
	11-31	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	90-100	85-95	70-90	25-39	9-18
	31-47	Silty clay loam, clay loam.	CL	A-6, A-7	0	95-100	85-100	75-90	65-85	29-48	10-23
	47-57	Clay loam, silty clay loam.	CL, GC, SC	A-2, A-4, A-6, A-7	5-25	45-90	25-85	25-80	25-75	25-48	9-23
	57-63	Weathered bedrock.	---	---	---	---	---	---	---	---	---
LoC---------- Lonewood	0-15	Silt loam--------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	75-90	18-26	3-9
	15-30	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	90-100	85-95	70-90	25-39	9-18
	30-51	Silty clay loam, clay loam.	CL	A-6, A-7	0	95-100	85-100	75-90	65-85	29-48	10-23
	51-57	Clay loam, silty clay loam.	CL, GC, SC	A-2, A-4, A-6, A-7	5-25	45-90	25-85	25-80	25-75	25-48	9-23
	57-63	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Mn*:											
Melvin----------	0-6	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	6-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-95	25-40	5-20
	60-66	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-95	25-40	5-20

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Mn*:											
Newark----------	0-5	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-90	22-35	3-12
	5-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-95	25-40	5-20
	60-68	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0-3	85-100	80-100	75-100	60-95	25-40	5-20
MvC---------- Minvale	0-10	Gravelly loam----	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	10-28	Gravelly silty clay loam, gravelly silt loam, gravelly loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	28-63	Gravelly silty clay loam, gravelly silty clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
MvD---------- Minvale	0-9	Gravelly loam----	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	9-30	Gravelly silty clay loam, gravelly silt loam, gravelly loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	30-65	Gravelly silty clay loam, gravelly clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
NeE---------- Nella	0-10	Stony loam-------	ML, CL, SM, SC	A-4	10-30	90-100	85-90	65-75	36-55	<30	NP-8
	10-48	Stony clay loam, stony sandy clay loam, stony clay loam.	CL, SC, CL-ML, SC-SM	A-4, A-6, A-2	0-30	75-95	60-90	45-70	30-60	25-40	6-20
	48-70	Stony clay loam, gravelly sandy clay loam, cobbly clay.	SC, SM, CL, ML	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27
Pt*. Pits, quarries											
RaC---------- Ramsey	0-2	Sandy loam-------	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	2-16	Loam, sandy loam, cobbly loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RaE---------- Ramsey	0-4	Sandy loam-------	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	4-15	Loam, sandy loam, fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
RrE*:											
Ramsey----------	0-4	Sandy loam-------	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	4-15	Loam, sandy loam, fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
SaA---------- Sequatchie	0-17	Loam----------	ML, CL-ML, CL, SM	A-2, A-4	0-10	85-100	75-100	65-95	30-70	15-27	2-10
	17-46	Clay loam, loam, silt loam.	CL-ML, CL	A-4, A-6	0-10	85-100	75-100	65-95	55-85	20-32	5-15
	46-68	Cobbly sandy loam, loam, gravelly fine sandy loam.	ML, CL-ML, CL, SM	A-2, A-4	10-40	75-95	65-95	45-80	25-65	15-25	2-10
SeA---------- Sequatchie	0-14	Loam----------	ML, CL-ML, CL, SM	A-2, A-4	0-10	85-100	75-100	65-95	30-70	15-27	2-10
	14-42	Clay loam, loam, silt loam.	CL-ML, CL	A-4, A-6	0-10	85-100	75-100	65-95	55-85	20-32	5-15
	42-62	Cobbly sandy loam, gravelly fine sandy loam.	ML, CL-ML, CL, SM	A-2, A-4	10-40	75-95	65-95	45-80	25-65	15-25	2-10
SeB---------- Sequatchie	0-14	Loam----------	ML, CL-ML, CL, SM	A-2, A-4	0-10	85-100	75-100	65-95	30-70	15-27	2-10
	14-45	Clay loam, loam, silt loam.	CL-ML, CL	A-4, A-6	0-10	85-100	75-100	65-95	55-85	20-32	5-15
	45-60	Cobbly sandy loam, loam, gravelly fine sandy loam.	ML, CL-ML, CL, SM	A-2, A-4	10-40	75-95	65-95	45-80	25-65	15-25	2-10
Sn---------- Sewanee	0-7	Loam----------	ML, CL-ML, SM	A-4	0-2	80-100	75-100	55-90	35-65	<30	NP-7
	7-39	Loam, silt loam, fine sandy loam.	ML, CL-ML, CL, SM	A-4	0-3	80-100	75-100	65-95	36-65	<35	NP-10
	39-60	Loam, sandy loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-2	0-5	60-100	55-100	45-95	25-70	<30	NP-10
Su---------- Sullivan	0-68	Loam, fine sandy loam.	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	60-100	36-90	20-31	3-10
Sw---------- Swafford	0-9	Loam----------	ML, CL-ML, CL	A-4	0	90-100	85-100	75-100	55-85	20-35	2-10
	9-22	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	22-46	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	46-65	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16

See footnote at end of table.

Table 13.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
TaC--- Tasso	0-10	Loam---	ML, CL-ML, CL	A-4	0-5	90-100	80-95	70-85	60-75	20-30	3-9
	10-21	Silt loam, loam, silty clay loam.	CL	A-4, A-6	0-5	90-100	80-95	75-90	65-80	27-36	9-15
	21-31	Silty clay loam, clay loam, gravelly clay loam.	CL	A-4, A-6	0-5	70-100	65-95	60-90	50-85	27-36	9-15
	31-66	Clay, clay loam, gravelly clay loam.	CL, ML, MH, CH	A-6, A-7	0-15	80-100	70-95	65-90	55-85	35-55	14-25
WaB--- Waynesboro	0-8	Loam---	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	8-14	Clay loam, loam, sandy clay loam.	CL, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	14-70	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WaC2--- Waynesboro	0-9	Loam---	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	9-65	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WaD2--- Waynesboro	0-7	Loam---	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	7-65	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WaD3--- Waynesboro	0-5	Clay loam---	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	5-60	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WaE2--- Waynesboro	0-5	Loam---	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	5-65	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
Wh--- Whitwell	0-9	Loam---	ML, CL-ML, CL	A-4	0-3	80-100	75-100	70-100	55-95	18-28	3-10
	9-70	Clay loam, loam, silt loam.	CL, CL-ML, ML, SC	A-4, A-6	0-3	80-100	75-100	60-90	40-80	18-35	3-15

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 14.--Physical and Chemical Properties of the Soils

(The symbol < means less than; the symbol > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates either that data were not available or that data were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AeC	0-12	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-2
Allen	12-62	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
AeD	0-16	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-2
Allen	16-62	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
AeE	0-15	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-2
Allen	15-72	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
BaC	0-11	5-20	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	3	.5-2
Barger	11-19	10-25	1.35-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.37		
	19-23	15-30	1.45-1.65	0.06-0.2	0.04-0.07	4.5-5.5	Low	0.20		
	23-63	20-35	1.45-1.65	0.06-0.2	0.02-0.05	4.5-5.5	Low	0.20		
BbB	0-9	10-25	1.30-1.50	2.0-6.0	0.14-0.20	3.6-5.5	Low	0.28	3	.5-2
Beersheba	9-33	18-35	1.35-1.55	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.24		
	33-45	---	---	0.2-0.6	---	---	Low	0.20		
BbC	0-8	10-25	1.30-1.50	2.0-6.0	0.14-0.20	3.6-5.5	Low	0.28	3	.5-2
Beersheba	8-31	18-35	1.35-1.55	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.24		
	31-42	---	---	0.2-0.6	---	---	Low	0.20		
BeD	0-10	18-27	1.40-1.55	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	5	<.5
Bethesda	10-65	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low	0.32		
BhF*:										
Bethesda	0-2	18-27	1.40-1.55	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	5	<.5
	2-70	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low	0.32		
Pits.										
BoD*:										
Bodine	0-18	8-20	1.35-1.55	2.0-6.0	0.07-0.12	3.6-5.5	Low	0.28	5	.5-1
	18-27	20-35	1.40-1.60	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.24		
	27-63	23-38	1.40-1.60	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.24		
Pailo	0-15	5-15	1.40-1.55	6.0-20	0.07-0.12	4.5-5.5	Low	0.20	5	.5-1
	15-29	10-35	1.40-1.55	2.0-6.0	0.04-0.10	4.5-5.5	Low	0.20		
	29-32	30-40	1.35-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.24		
	32-65	60-80	1.35-1.45	0.2-0.6	0.11-0.15	4.5-5.5	Moderate	0.28		
BoE*:										
Bodine	0-16	8-20	1.35-1.55	2.0-6.0	0.07-0.12	3.6-5.5	Low	0.28	5	.5-1
	16-37	20-35	1.40-1.60	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.24		
	37-65	23-38	1.40-1.60	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.24		
Pailo	0-12	5-15	1.40-1.55	6.0-20	0.07-0.12	4.5-5.5	Low	0.20	5	1-2
	12-27	10-35	1.40-1.55	2.0-6.0	0.04-0.10	4.5-5.5	Low	0.20		
	27-31	30-40	1.35-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.24		
	31-67	60-80	1.35-1.45	0.2-0.6	0.11-0.15	4.5-5.5	Moderate	0.28		
Br	0-9	10-25	1.30-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	4	2-4
Bonair	9-49	18-27	1.30-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37		
	49-64	10-25	1.30-1.45	0.6-2.0	0.12-0.20	4.5-5.5	Low	0.37		

See footnote at end of table.

Table 14.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BuF----------	0-20	10-20	1.35-1.50	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20	5	1-2
Bouldin	20-70	17-35	1.40-1.55	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20		
CaB----------	0-9	15-27	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.0	Low----------	0.37	4	.5-2
Capshaw	9-20	25-45	1.35-1.55	0.6-2.0	0.16-0.20	5.1-6.0	Low----------	0.37		
	20-52	35-55	1.40-1.55	0.06-0.2	0.12-0.18	5.1-6.0	Moderate-----	0.24		
	52-60	35-50	1.40-1.60	0.06-0.2	0.12-0.16	5.6-7.8	Moderate-----	0.24		
CbF*:										
Carbo----------	0-5	20-40	1.20-1.40	0.6-2.0	0.16-0.19	4.5-7.3	Moderate-----	0.37	2	.5-2
	5-30	60-80	1.30-1.45	0.06-0.2	0.10-0.14	5.6-7.8	High---------	0.24		
	30	---	---	2.0-20.0	---	---	----------	----		
Rock outcrop.										
CoA----------	0-10	8-20	1.40-1.60	2.0-6.0	0.08-0.13	4.5-5.5	Low----------	0.17	5	1-3
Cobstone	10-70	15-30	1.40-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low----------	0.17		
CoB----------	0-9	8-20	1.40-1.60	2.0-6.0	0.07-0.12	4.5-5.5	Low----------	0.17	5	1-3
Cobstone	9-35	15-30	1.40-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low----------	0.17		
	35-60	5-20	1.45-1.65	2.0-6.0	0.04-0.09	4.5-5.5	Low----------	0.17		
CtC2*:										
Colbert---------	0-7	27-40	1.20-1.40	0.2-0.6	0.15-0.20	4.5-6.5	Moderate-----	0.32	3	.5-2
	7-24	35-50	1.20-1.60	0.06-0.2	0.14-0.20	4.5-6.5	High---------	0.32		
	24-41	50-70	1.00-1.30	<0.06	0.12-0.16	4.5-6.5	High---------	0.32		
	41-52	40-65	1.10-1.45	<0.06	0.10-0.15	6.1-7.8	High---------	0.32		
	52	---	---	0.00-0.06	---	---	----------	----		
Talbott---------	0-5	32-50	1.35-1.55	0.6-2.0	0.10-0.16	5.1-6.5	Moderate-----	0.32	2	<1
	5-37	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.5	Moderate-----	0.24		
	37	---	---	0.00-0.06	---	---	----------	----		
Braxton---------	0-7	20-35	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.0	Low----------	0.32	5	.5-2
	7-34	40-60	1.25-1.45	0.6-2.0	0.12-0.17	5.1-6.0	Moderate-----	0.20		
	34-67	45-65	1.25-1.45	0.2-0.6	0.10-0.15	5.1-6.5	Moderate-----	0.20		
CtD2*:										
Colbert---------	0-5	27-40	1.20-1.40	0.2-0.6	0.15-0.20	4.5-6.5	Moderate-----	0.32	3	.5-2
	5-21	35-50	1.20-1.60	0.06-0.2	0.14-0.20	4.5-6.5	High---------	0.32		
	21-38	50-70	1.00-1.30	<0.06	0.12-0.16	4.5-6.5	High---------	0.32		
	38-46	40-65	1.10-1.45	<0.06	0.10-0.15	6.1-7.8	High---------	0.32		
	46	---	---	0.00-0.06	---	---	----------	----		
Talbott---------	0-5	32-50	1.35-1.55	0.6-2.0	0.10-0.16	5.1-6.5	Moderate-----	0.32	2	<1
	5-29	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.5	Moderate-----	0.24		
	29	---	---	0.00-0.06	---	---	----------	----		
Braxton---------	0-6	20-35	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.0	Low----------	0.32	5	.5-2
	6-31	40-60	1.25-1.45	0.6-2.0	0.12-0.17	5.1-6.0	Moderate-----	0.20		
	31-63	45-65	1.25-1.45	0.2-0.6	0.10-0.15	5.1-6.5	Moderate-----	0.20		
CxD*:										
Colbert---------	0-5	5-27	1.30-1.55	0.6-2.0	0.15-0.22	4.5-6.5	Low----------	0.37	3	.5-2
	5-25	35-50	1.20-1.60	0.06-0.2	0.14-0.20	4.5-6.5	High---------	0.32		
	25-44	50-70	1.00-1.30	<0.06	0.12-0.16	4.5-6.5	High---------	0.32		
	44-49	40-65	1.10-1.45	<0.06	0.10-0.15	6.1-7.8	High---------	0.32		
	49	---	---	0.00-0.06	---	---	----------	----		

See footnote at end of table.

Table 14.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
CxD*:										
Talbott	0-5	15-27	1.35-1.50	0.6-2.0	0.16-0.20	5.1-6.5	Low	0.37	2	.5-2
	5-35	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.5	Moderate	0.24		
	35	---	---	0.00-0.06	---	---	---	---		
Rock outcrop.										
EnE	0-5	10-25	1.25-1.50	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.32	4	.5-2
Enders	5-9	27-45	1.25-1.50	0.2-0.6	0.12-0.18	3.6-5.5	Moderate	0.28		
	9-38	35-60	1.15-1.45	<0.06	0.12-0.18	3.6-5.5	High	0.24		
	38-50	40-60	1.20-1.45	<0.06	0.08-0.17	3.6-5.5	High	0.24		
	50-55	---	---	0.01-0.2	---	---	---	---		
EtB	0-9	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	1-3
Etowah	9-32	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
	32-72	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
EtC2	0-9	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	1-3
Etowah	9-30	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
	30-65	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
FnC2	0-8	15-27	1.45-1.55	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
Fullerton	8-12	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	12-63	40-70	1.45-1.55	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
FnE	0-15	15-27	1.45-1.55	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
Fullerton	15-21	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	21-72	40-70	1.45-1.55	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
GpC	0-10	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
Gilpin	10-24	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	24-30	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	30-45	---	---	0.2-2.0	---	---	---	---		
GpD	0-10	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
Gilpin	10-25	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	25-31	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	31-45	---	---	0.2-2.0	---	---	---	---		
GpE	0-11	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
Gilpin	11-25	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	25-34	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	34-45	---	---	0.2-2.0	---	---	---	---		
GrF*:										
Gilpin	0-3	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low	0.24	3	---
	3-28	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	28-33	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	33-45	---	---	0.2-2.0	---	---	---	---		
Ramsey	0-4	8-25	1.25-1.50	6.0-20	0.06-0.10	4.5-5.5	Low	0.17	1	---
	4-14	8-25	1.20-1.40	6.0-20	0.06-0.10	4.5-5.5	Low	0.17		
	14	---	---	0.0-0.2	---	---	---	---		
Rock outcrop.										
Ha	0-9	15-25	1.30-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Low	0.32	5	1-3
Hamblen	9-44	18-32	1.30-1.45	0.6-2.0	0.17-0.20	5.1-7.3	Low	0.32		
	44-65	18-32	1.30-1.45	0.6-2.0	0.17-0.20	5.1-7.3	Low	0.32		

See footnote at end of table.

Table 14.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
HoB	0-9	10-25	1.35-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28	5	.5-2
Holston	9-70	18-35	1.40-1.55	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
HoC2	0-8	10-25	1.35-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28	5	.5-2
Holston	8-65	18-35	1.40-1.55	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
JeC	0-6	10-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low	0.24	4	.5-3
Jefferson	6-61	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28		
JeD	0-6	10-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low	0.24	4	.5-3
Jefferson	6-63	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28		
JeE	0-11	10-25	1.30-1.50	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.10	4	.5-3
Jefferson	11-54	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28		
	54-65	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low	0.17		
LaB	0-5	7-27	1.20-1.40	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	2	.5-2
Lily	5-31	18-35	1.25-1.35	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.28		
	31	---	---	0.0-0.2	---	---				
LaC	0-7	7-27	1.20-1.40	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	2	.5-2
Lily	7-30	18-35	1.25-1.35	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.28		
	30	---	---	0.0-0.2	---	---				
LaD	0-4	7-27	1.20-1.40	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	2	.5-2
Lily	4-31	18-35	1.25-1.35	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.28		
	31	---	---	0.0-0.2	---	---				
LoB	0-11	15-25	1.30-1.40	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.37	4	.5-2
Lonewood	11-31	20-39	1.30-1.45	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.37		
	31-47	25-45	1.40-1.55	0.6-2.0	0.14-0.17	4.5-5.5	Low	0.32		
	47-57	25-45	1.40-1.55	0.6-2.0	0.05-0.11	4.5-5.5	Low	0.32		
	57	---	---	0.00-0.2	---	---				
LoC	0-15	15-25	1.30-1.40	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.37	4	1-3
Lonewood	15-30	20-39	1.30-1.45	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.37		
	30-51	25-45	1.40-1.55	0.6-2.0	0.14-0.17	4.5-5.5	Low	0.32		
	51-57	25-45	1.40-1.55	0.6-2.0	0.05-0.11	4.5-5.5	Low	0.32		
	57	---	---	0.00-0.2	---	---				
Mn*:										
Melvin	0-6	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.1-7.8	Low	0.43	5	.5-3
	6-60	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.1-7.8	Low	0.43		
	60-66	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.1-7.8	Low	0.43		
Newark	0-5	18-27	1.20-1.40	0.6-2.0	0.20-0.24	5.1-7.8	Low	0.43	5	.5-3
	5-60	18-35	1.20-1.45	0.6-2.0	0.16-0.22	5.1-7.8	Low	0.32		
	60-68	18-35	1.30-1.50	0.6-2.0	0.15-0.22	5.1-7.8	Low	0.32		
MvC	0-10	15-30	1.30-1.45	2.0-6.0	0.14-0.18	4.5-5.5	Low	0.28	5	.5-2
Minvale	10-28	20-35	1.40-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	28-63	25-45	1.40-1.55	0.6-2.0	0.11-0.17	4.5-5.5	Low	0.28		
MvD	0-9	15-30	1.30-1.45	2.0-6.0	0.14-0.18	4.5-5.5	Low	0.28	5	.5-2
Minvale	9-30	20-35	1.40-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	30-65	25-45	1.40-1.55	0.6-2.0	0.11-0.17	4.5-5.5	Low	0.28		
NeE	0-10	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.15	5	1-3
Nella	10-48	22-35	1.35-1.55	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.15		
	48-70	27-45	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.15		

See footnote at end of table.

Table 14.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Pt*.										
Pits, quarries										
RaC	0-2	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	---
Ramsey	2-16	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	16	---	---	0.00-0.2	---	---	---	----		
RaE	0-4	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	---
Ramsey	4-15	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	15	---	---	0.00-0.2	---	---	---	----		
RrE*:										
Ramsey	0-4	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	---
	4-15	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	15	---	---	0.00-0.2	---	---	---	----		
Rock outcrop.										
SaA	0-17	10-25	1.50-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	5	1-3
Sequatchie	17-46	18-30	1.55-1.70	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.24		
	46-68	12-25	1.55-1.70	0.6-6.0	0.09-0.14	4.5-5.5	Low	0.24		
SeA	0-14	10-25	1.50-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	5	1-3
Sequatchie	14-42	18-30	1.55-1.70	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.24		
	42-62	12-25	1.55-1.70	0.6-6.0	0.09-0.14	4.5-5.5	Low	0.24		
SeB	0-14	10-25	1.50-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	5	1-3
Sequatchie	14-45	18-30	1.55-1.70	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.24		
	45-60	12-25	1.55-1.70	0.6-6.0	0.09-0.14	4.5-5.5	Low	0.24		
Sn	0-7	10-18	1.35-1.55	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.28	3	1-3
Sewanee	7-39	10-18	1.35-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	39-60	10-18	1.35-1.55	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.24		
Su	0-68	18-25	1.30-1.45	0.6-2.0	0.12-0.20	5.1-7.3	Low	0.32	5	1-3
Sullivan										
Sw	0-9	12-25	1.35-1.50	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37	5	1-2
Swafford	9-22	18-32	1.40-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Low	0.32		
	22-46	18-32	1.45-1.60	0.2-0.6	0.13-0.17	4.5-6.0	Low	0.32		
	46-65	18-32	1.40-1.55	0.6-2.0	0.13-0.17	4.5-6.0	Low	0.32		
TaC	0-10	10-25	1.35-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	5	.5-2
Tasso	10-21	20-35	1.40-1.55	0.6-2.0	0.17-0.19	4.5-5.5	Low	0.32		
	21-31	20-35	1.50-1.70	0.2-0.6	0.10-0.15	4.5-5.5	Low	0.32		
	31-66	30-45	1.35-1.50	0.2-2.0	0.10-0.15	4.5-5.5	Moderate	0.28		
WaB	0-8	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	8-14	23-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	14-70	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
WaC2	0-9	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	9-16	23-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	16-65	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
WaD2	0-7	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	7-65	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
WaD3	0-5	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	<1
Waynesboro	5-60	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		

See footnote at end of table.

Table 14.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
WaE2	0-5	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	5-65	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
Wh	0-9	10-25	1.35-1.55	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.32	5	1-2
Whitwell	9-70	18-32	1.40-1.70	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 15.--Soil and Water Features

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AeC, AeD, AeE----- Allen	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
BaC---------- Barger	C	None--------	---	---	1.5-2.5	Perched	Jan-Mar	>60	---	Moderate	Moderate.
BbB, BbC---------- Beersheba	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
BeD---------- Bethesda	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
BhF*:											
Bethesda---------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Pits.											
BoD*, BoE*:											
Bodine----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Pailo----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Br---------- Bonair	D	Occasional	Very brief	Dec-Apr	0-1.0	Apparent	Dec-Apr	40-70	Hard	High-----	High.
BuF---------- Bouldin	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
CaB---------- Capshaw	C	None--------	---	---	3.5-5.0	Apparent	Dec-Mar	48-84	Hard	High-----	Moderate.
CbF*:											
Carbo----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Low.
Rock outcrop.											
CoA---------- Cobstone	B	Rare--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
CoB---------- Cobstone	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
CtC2*, CtD2*:											
Colbert----------	D	None--------	---	---	3.5-5.0	Perched	Dec-Mar	40-60	Hard	High-----	Moderate.
Talbott----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Braxton----------	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
CxD*:											
Colbert----------	D	None--------	---	---	3.5-5.0	Perched	Dec-Mar	40-60	Hard	High-----	Moderate.
Talbott----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Rock outcrop.											

See footnote at end of table.

Table 15.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
EnE---------- Enders	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
EtB, EtC2---------- Etowah	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
FnC2, FnE---------- Fullerton	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
GpC, GpD, GpE----- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
GrF*:											
Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Ramsey----------	D	None--------	---	---	>6.0	---	---	7-20	Hard	Low------	Moderate.
Rock outcrop.											
Ha---------- Hamblen	C	Occasional	Very brief	Dec-Mar	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
HoB, HoC2---------- Holston	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
JeC, JeD, JeE----- Jefferson	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
LaB, LaC, LaD----- Lily	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
LoB, LoC---------- Lonewood	B	None--------	---	---	>6.0	---	---	40-72	Hard	Low------	Moderate.
Mn*:											
Melvin----------	D	Frequent----	Very long	Dec-Apr	+2-0.5	Apparent	Nov-May	>60	---	High-----	Low.
Newark----------	D	Frequent----	Very long	Dec-Apr	+1-1.0	Apparent	Nov-May	>60	---	High-----	Low.
MvC, MvD---------- Minvale	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
NeE---------- Nella	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Pt*. Pits, quarries											
RaC, RaE---------- Ramsey	D	None--------	---	---	>6.0	---	---	7-20	Hard	Low------	Moderate.
RrE*:											
Ramsey----------	D	None--------	---	---	>6.0	---	---	7-20	Hard	Low------	Moderate.
Rock outcrop.											
SaA---------- Sequatchie	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
SeA---------- Sequatchie	B	Rare--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.

See footnote at end of table.

Table 15.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
SeB---------- Sequatchie	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Sn---------- Sewanee	B	Occasional	Very brief	Dec-Mar	1.0-2.0	Apparent	Dec-Mar	40-60	Hard	Moderate	Moderate.
Su---------- Sullivan	B	Occasional	Very brief	Dec-Mar	4.0-6.0	Apparent	Dec-Mar	>60	---	Low------	Low.
Sw---------- Swafford	C	None--------	---	---	2.0-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
TaC---------- Tasso	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
WaB, WaC2, WaD2, WaD3, WaE2------- Waynesboro	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Wh---------- Whitwell	C	Rare--------	---	---	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 16.--Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. The text describes soil characteristics outside the range of the series)

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Barger	Fine-loamy, siliceous, thermic Typic Fragiudults
Beersheba	Fine-loamy, siliceous, mesic Typic Hapludults
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Bodine	Loamy-skeletal, siliceous, thermic Typic Paleudults
Bonair	Fine-loamy, siliceous, mesic Humic Endoaquepts
Bouldin	Loamy-skeletal, siliceous, mesic Typic Paleudults
Braxton	Fine, mixed, thermic Typic Paleudalfs
Capshaw	Fine, mixed, thermic Oxyaquic Hapludalfs
Carbo	Very-fine, mixed, mesic Typic Hapludalfs
Cobstone	Loamy-skeletal, siliceous, thermic Typic Hapludults
Colbert	Fine, montmorillonitic, thermic Vertic Hapludalfs
Enders	Clayey, mixed, thermic Typic Hapludults
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Fullerton	Clayey, kaolinitic, thermic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Hamblen	Fine-loamy, siliceous, thermic Fluvaquentic Eutrochrepts
Holston	Fine-loamy, siliceous, thermic Typic Paleudults
Jefferson	Fine-loamy, siliceous, mesic Typic Hapludults
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
Lonewood	Fine-loamy, siliceous, mesic Typic Hapludults
*Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Minvale	Fine-loamy, siliceous, thermic Typic Paleudults
Nella	Fine-loamy, siliceous, thermic Typic Paleudults
*Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Pailo	Loamy-skeletal over clayey, siliceous, thermic Typic Paleudults
Ramsey	Loamy, siliceous, mesic Lithic Dystrochrepts
Sequatchie	Fine-loamy, siliceous, thermic Humic Hapludults
Sewanee	Coarse-loamy, siliceous, mesic Fluvaquentic Dystrochrepts
Sullivan	Fine-loamy, siliceous, thermic Dystric Fluventic Eutrochrepts
Swafford	Fine-loamy, siliceous, thermic Fragiaquic Paleudults
Talbott	Fine, mixed, thermic Typic Hapludalfs
Tasso	Fine-loamy, siliceous, thermic Fragic Paleudults
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults
Whitwell	Fine-loamy, siliceous, thermic Aquic Hapludults

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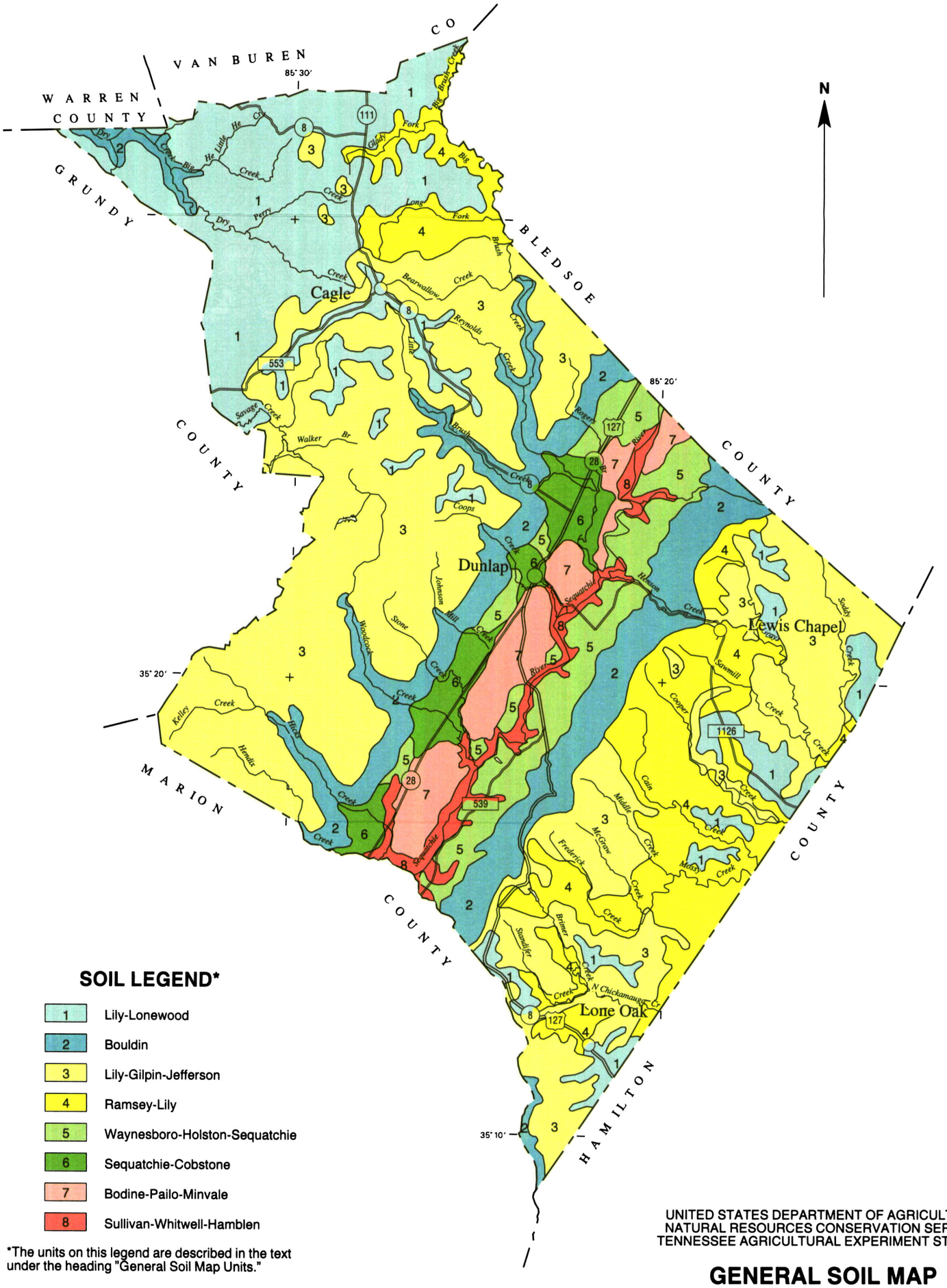


SOIL LEGEND*

1	Lily-Lonewood
2	Bouldin
3	Lily-Gilpin-Jefferson
4	Ramsey-Lily
5	Waynesboro-Holston-Sequatchie
6	Sequatchie-Cobstone
7	Bodine-Pailo-Minvale
8	Sullivan-Whitwell-Hamblen

*The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1992

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
TENNESSEE AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

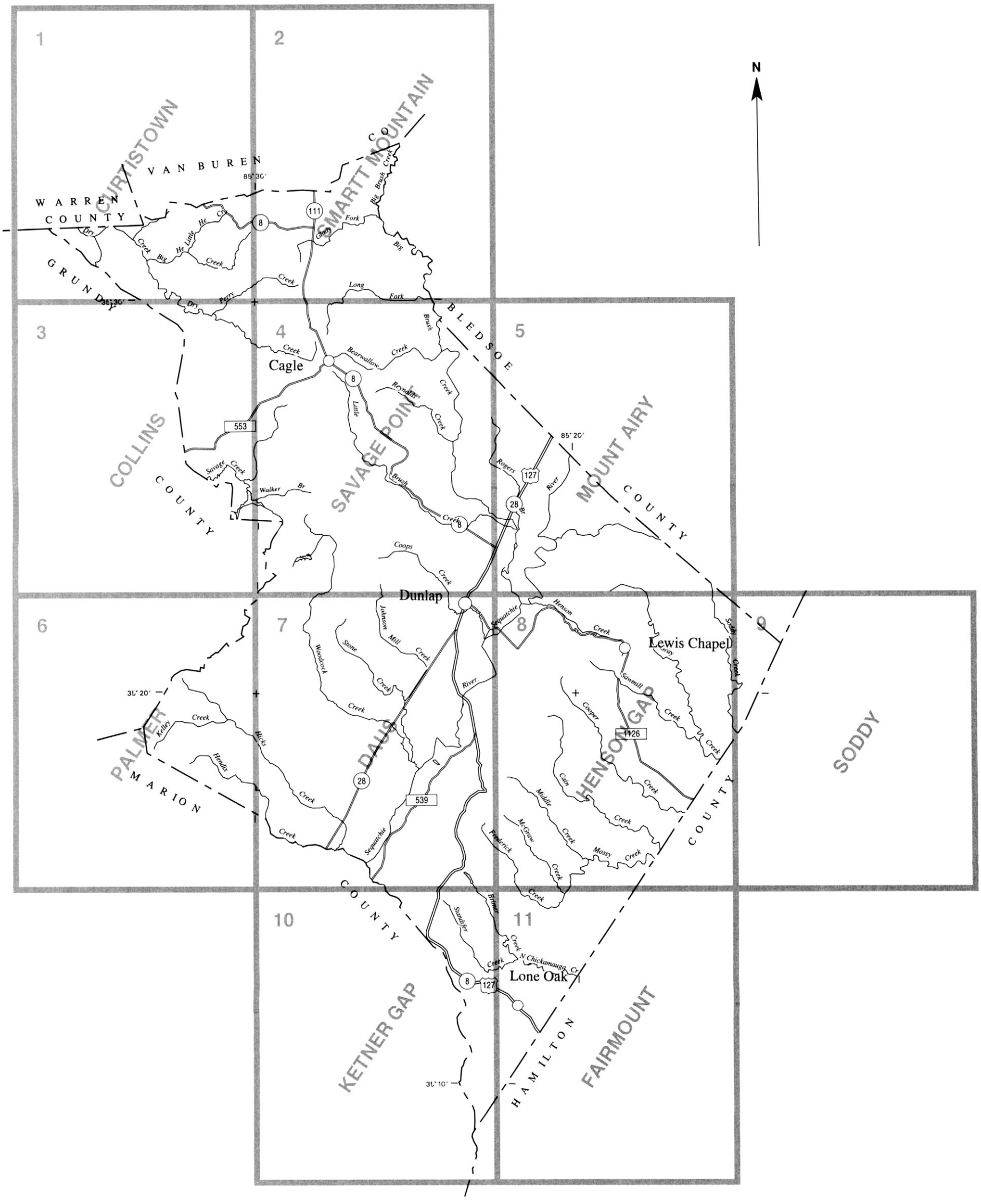
SEQUATCHIE COUNTY, TENNESSEE

Scale 1:190080

1 0 1 2 3
MILES

1 0 1 2 3 4 5 6
KILOMETERS

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

SEQUATCHIE COUNTY, TENNESSEE

Scale 1:190080

1 0 1 2 3

MILES

1 0 1 2 3 4 5 6

KILOMETERS

SOIL LEGEND

Map symbols consists of a combination of letters and numbers. The first two letters are alphabetically and represent the kind of soil. The first letter is a capital letter and the second letter is a small letter. A capital letter following the small letter indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A number 2 following the slope letter indicates that the soil is moderately eroded and a 3 indicates it is severely eroded.

SYMBOL	NAME
AeC	Allen loam, 5 to 12 percent slopes
AeD	Allen loam, 12 to 20 percent slopes
AeE	Allen loam, 20 to 30 percent slopes
BaC	Barger silt loam, 6 to 12 percent slopes
BbB	Beersheba loam, 2 to 6 percent slopes
BbC	Beersheba loam, 6 to 12 percent slopes
BeD	Bethesda channery loam, 8 to 25 percent slopes
BhF	Bethesda-Pits complex, 20 to 90 percent slopes
BoD	Bodine and Pailo gravelly loams, 12 to 20 percent slopes
BoE	Bodine and Pailo gravelly loams, 20 to 50 percent slopes
Br	Bonair loam, occasionally flooded
BuF	Bouldin stony loam, 20 to 75 percent slopes, bouldery
CaB	Capshaw silt loam, 2 to 5 percent slopes
CbF	Carbo-Rock outcrop complex, 20 to 60 percent slopes
CoA	Cobstone cobbly fine sandy loam, 0 to 3 percent slopes, rarely flooded
CoB	Cobstone stony loam, 2 to 5 percent slopes
CtC2	Colbert-Talbott-Braxton complex, 5 to 12 percent slopes, eroded
CtD2	Colbert-Talbott-Braxton complex, 12 to 20 percent slopes, eroded
CxD	Colbert-Talbott-Rock outcrop complex, 5 to 20 percent slopes
EnE	Enders silt loam, 20 to 50 percent slopes
EtB	Etowah silt loam, 2 to 5 percent slopes
EtC2	Etowah silt loam, 5 to 12 percent slopes, eroded
FnC2	Fullerton gravelly silt loam, 5 to 15 percent slopes, eroded
FnE	Fullerton gravelly loam, 15 to 30 percent slopes
GpC	Gilpin channery silt loam, 6 to 12 percent slopes
GpD	Gilpin channery silt loam, 12 to 20 percent slopes
GpE	Gilpin channery silt loam, 20 to 45 percent slopes
GrF	Gilpin-Ramsey-Rock outcrop complex, 20 to 60 percent slopes
Ha	Hamblen loam, occasionally flooded
HoB	Holston loam, 2 to 5 percent slopes
HoC2	Holston loam, 5 to 12 percent slopes, eroded
JeC	Jefferson loam, 5 to 12 percent slopes
JeD	Jefferson loam, 12 to 20 percent slopes
JeE	Jefferson stony loam, 20 to 50 percent slopes
LaB	Lily loam, 2 to 6 percent slopes
LaC	Lily loam, 6 to 12 percent slopes
LaD	Lily loam, 12 to 20 percent slopes
LoB	Lonewood silt loam, 2 to 5 percent slopes
LoC	Lonewood silt loam, 5 to 12 percent slopes
Mn	Melvin and Newark silt loams, depressional
MvC	Minvale gravelly loam, 6 to 12 percent slopes
MvD	Minvale gravelly loam, 12 to 20 percent slopes
NeE	Nella stony loam, 12 to 30 percent slopes
Pt	Pits, quarries
RaC	Ramsey sandy loam, 5 to 15 percent slopes
RaE	Ramsey sandy loam, 15 to 35 percent slopes
RrE	Ramsey-Rock outcrop complex, 15 to 50 percent slopes
SaA	Sequatchie loam, 0 to 2 percent slopes
SeA	Sequatchie loam, 0 to 2 percent slopes, rarely flooded
SeB	Sequatchie loam, 2 to 6 percent slopes
Sn	Sewanee loam, occasionally flooded
Su	Sullivan loam, occasionally flooded
Sw	Swafford loam, 0 to 3 percent slopes
TaC	Tasso loam, 5 to 12 percent slopes
WaB	Waynesboro loam, 2 to 6 percent slopes
WaC2	Waynesboro loam, 6 to 12 percent slopes, eroded
WaD2	Waynesboro loam, 12 to 20 percent slopes, eroded
WaD3	Waynesboro clay loam, 12 to 25 percent slopes, severely eroded
WaE2	Waynesboro loam, 20 to 30 percent slopes, eroded
Wh	Whitwell loam, rarely flooded
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County or parish
- Reservation (national forest or park, state forest or park, and large airport)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

ROAD EMBLEM & DESIGNATIONS

- Federal
- State

RAILROAD — (label only)

DAMS

- Medium or Small (Named where applicable)

PITS

- Mine or quarry

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Spring
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

DEPRESSION OR SINK

SOIL SAMPLE SITE (typical pedon)

MISCELLANEOUS

- Rock outcrop (includes sandstone and shale)
- Cobbly spot

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

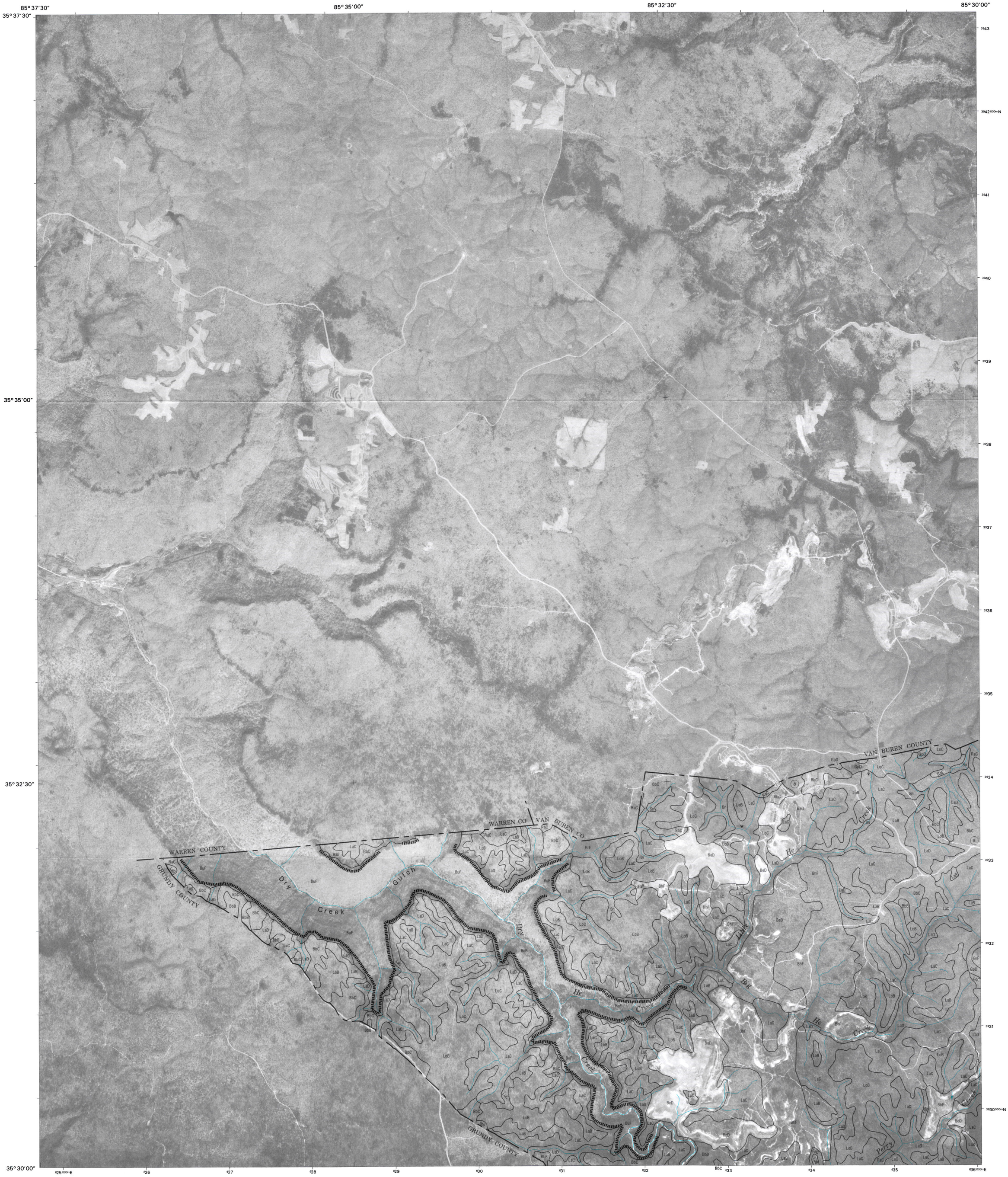
SEQUATCHIE COUNTY, TENNESSEE
CURTISTOWN QUADRANGLE
SHEET NUMBER 1 OF 11

85°37'30" 85°35'00" 85°32'30" 85°30'00"

35°37'30" 35°35'00" 35°32'30" 35°30'00"

3943 3942 000mN 3941 3940 3939 3938 3937 3936 3935 3934 3933 3932 3931 3930 000mN

625 000mE 626 627 628 629 630 631 632 633 634 635 636 000mE



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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3	1 CARDWELL MOUNTAIN 2 WELCHLAND 3 SPENCER
4		5	4 IRVING COLLEGE 5 SMARTT MOUNTAIN 6 ALTAMONT
6	7	8	7 COLLINS 8 SAVAGE POINT

INDEX TO ADJOINING 7.5 MAPS

CURTISTOWN, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 1 OF 11

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

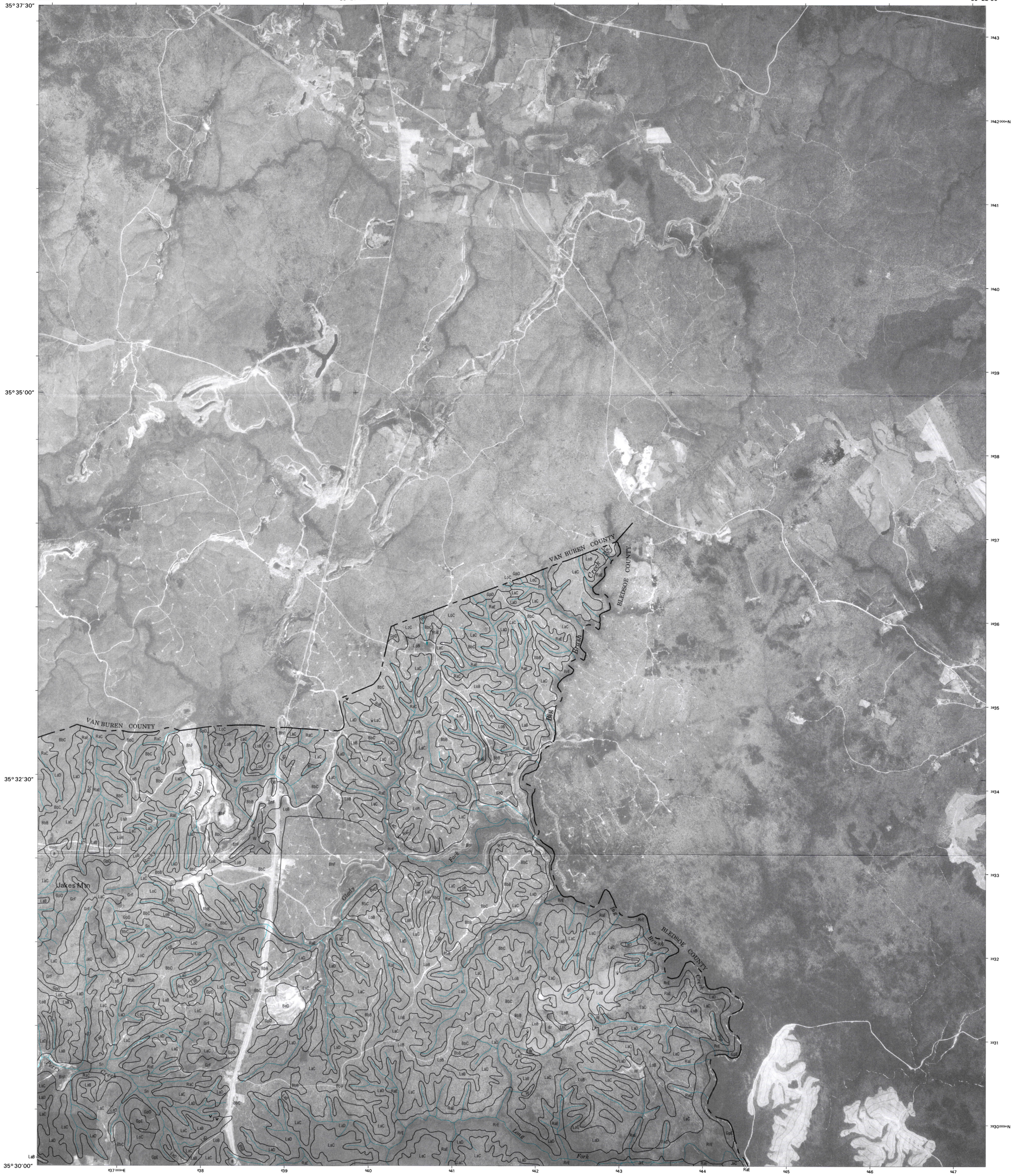
SEQUATCHIE COUNTY, TENNESSEE
SMARTT MOUNTAIN QUADRANGLE
SHEET NUMBER 2 OF 11

85°30'00" 85°27'30" 85°25'00" 85°22'30"

35°37'30" 35°35'00" 35°32'30" 35°30'00"

3943 3942 000mN 3941 3940 3939 3938 3937 3936 3935 3934 3933 3932 3931 3930 000mN

637 000mE 638 639 640 641 642 643 644 645 646 647



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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3
4		5
6	7	8

1 WELCHLAND
2 SPENCER
3 SAMPSON
4 CURTISTOWN
5 BROCKDELL
6 COLLINS
7 SAVAGE POINT
8 MOUNT AIRY

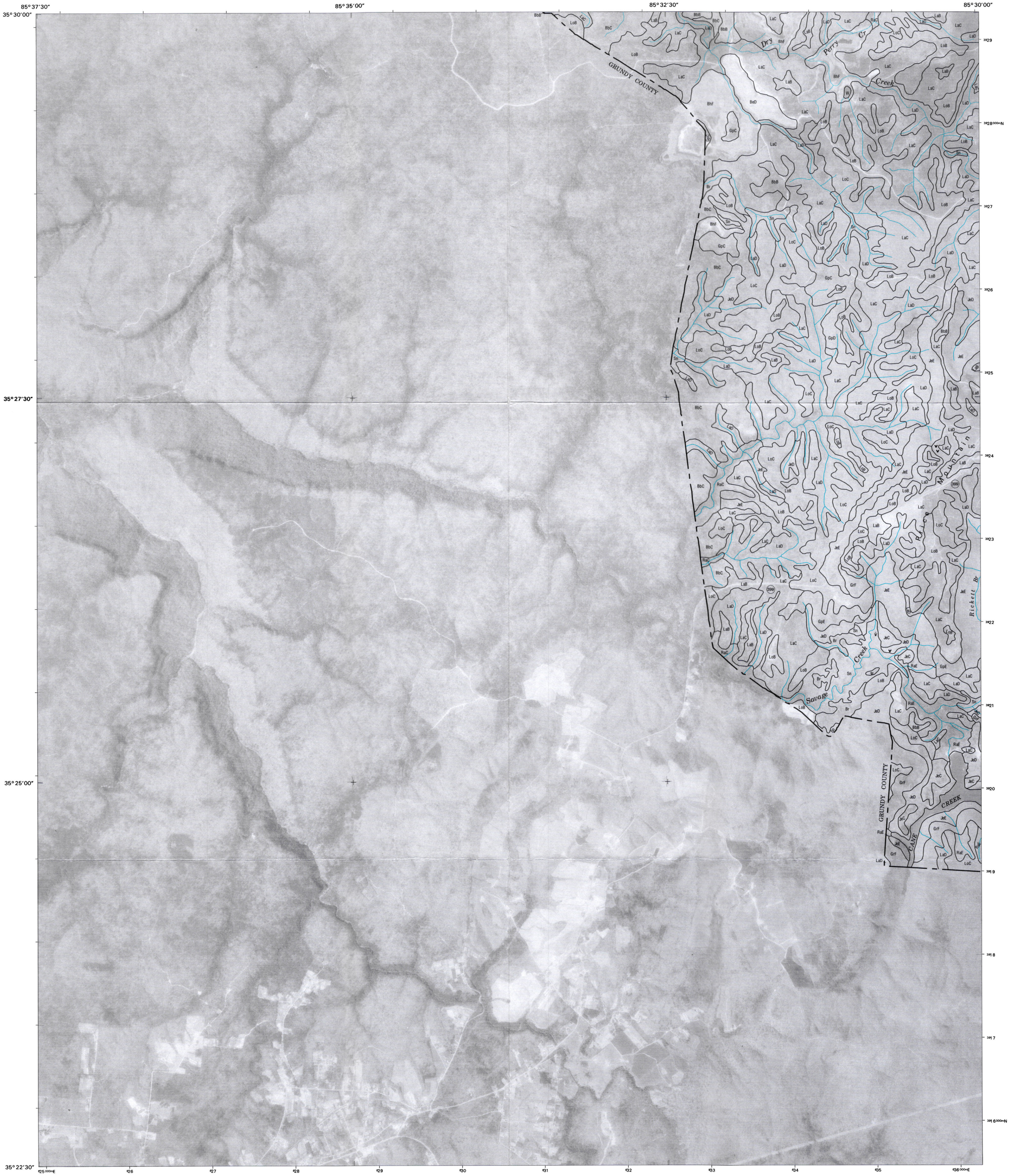
INDEX TO ADJOINING 7.5 MAPS

SMARTT MOUNTAIN, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 2 OF 11

SEQUATCHIE COUNTY, TENNESSEE NO. 2

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SEQUATCHIE COUNTY, TENNESSEE
COLLINS QUADRANGLE
SHEET NUMBER 3 OF 11



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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3	1 IRVING COLLEGE 2 CURTISTOWN 3 SMARTT MOUNTAIN 4 ALTAMONT 5 SAVAGE POINT 6 TRACY CITY 7 PALMER 8 DAUS
4		5	
6	7	8	

INDEX TO ADJOINING 7.5 MAPS

COLLINS, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 3 OF 11

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SEQUATCHIE COUNTY, TENNESSEE
SAVAGE POINT QUADRANGLE
SHEET NUMBER 4 OF 11

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3	1 CURTISTOWN 2 SMARTT MOUNTAIN 3 BROCKDELL
4		5	4 COLLINS 5 MOUNT AIRY
6	7	8	6 PALMER 7 DAUS 8 HENSON GAP

INDEX TO ADJOINING 7.5 MAPS

SAVAGE POINT, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 4 OF 11

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1 KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 MILES

1	2	3
4		5
6	7	8

1 SMARTT MOUNTAIN
2 BROCKDELL
3 PIKEVILLE
4 SAVAGE POINT
5 BRAYTON
6 DAUS
7 HENSON GAP
8 SODDY

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MOUNT AIRY, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 5 OF 11

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SEQUATCHIE COUNTY, TENNESSEE
PALMER QUADRANGLE
SHEET NUMBER 6 OF 11

85°37'30"
85°35'00"
85°32'30"
85°30'00"
35°22'30"
35°20'00"
35°17'30"
35°15'00"

3915
3914
3913
3912
3911
3910
3909
3908
3907
3906
3905
3904
3903
3902

626 000mE
627
628
629
630
631
632
633
634
635
636

GRUNDY COUNTY
MARION COUNTY
Bunker Hill
Kelley Creek
Hendrix Creek

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3	1 ALTAMONT 2 COLLINS 3 SAVAGE POINT
4		5	4 TRACY CITY 5 DAUS
6	7	8	6 WHITE CITY 7 WHITWELL 8 KETNER GAP

INDEX TO ADJOINING 7.5 MAPS

PALMER, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 6 OF 11

SEQUATCHIE COUNTY, TENNESSEE NO. 6

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SEQUATCHIE COUNTY, TENNESSEE
DAUS QUADRANGLE
SHEET NUMBER 7 OF 11

85°30′00″ 85°27′30″ 85°25′00″ 85°22′30″
35°22′30″ 35°20′00″ 35°17′30″ 35°15′00″

3915 3914.000mN 3913 3912 3911 3910 3909 3908 3907 3906 3905 3904 3903 3902.000mN

637.000mE 638 639 640 641 642 643 644 645 646 647

DUNLAP
Daus
Woodcock
Cartwright
Johnson Mill Creek
Woodcock Gulf Creek
Hicks Creek
Coops Creek
Mill Creek
Johnson Mill Creek
Woodcock Creek
Hicks Creek
Cartwright Creek
Mill Creek
Roderick Creek
SEQUATCHIE VALLEY
SEQUATCHIE RIVER
SEQUATCHIE VALLEY
SEQUATCHIE RIVER
MARION COUNTY

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3	1 COLLINS 2 SAVAGE POINT 3 MOUNT AIRY
4		5	4 PALMER 5 HENSON GAP 6 WHITWELL
6	7	8	7 KETNER GAP 8 FAIRMOUNT

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DAUS, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 7 OF 11

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SEQUATCHIE COUNTY, TENNESSEE
HENSON GAP QUADRANGLE
SHEET NUMBER 8 OF 11

85°22′30″ 85°20′00″ 85°17′30″ 85°15′00″

35°22′30″ 35°20′00″ 35°17′30″ 35°15′00″

3914 000mN 3913 3912 3911 3910 3909 3908 3907 3906 3905 3904 3903 3902 000mN

648 000mE 649 650 651 652 653 654 655 656 657 658 659 000mE

Dunlap
Henson Gap
Lewis Chapel
Walnut Gap
Jack Gap
Sawmill
Cooper
Creek
Gray
Soddy
Creek
Mansfield
Gulf
Creek
Cooper
Creek
HAMILTON COUNTY
BLEDSOE CO
Cain
Creek
Keil
Ridge
Marzee
Madrew
Ridge
Frederick
Creek
Mossy
Creek
The
Horseshoe
Creek
SEQUATCHIE VALLEY
SEQUATCHIE
FREDERICK
RIDGE

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

	2	3
4		5
6	7	8

1 SAVAGE POINT
2 MOUNT AIRY
3 BRAYTON
4 DAUS
5 SODDY
6 KETNER GAP
7 FAIRMOUNT
8 DAISY

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HENSON GAP, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 8 OF 11

SEQUATCHIE COUNTY, TENNESSEE NO. 8

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SEQUATCHIE COUNTY, TENNESSEE
SODDY QUADRANGLE
SHEET NUMBER 9 OF 11

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3
4		5
6	7	8

1 MOUNT AIRY
2 BRAYTON
3 GRAYSVILLE
4 HENSON GAP
5 GRASSHOPPER CREEK
6 FAIRMOUNT
7 DAISY
8 SNOW HILL

INDEX TO ADJOINING 7.5 MAPS

SODDY, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 9 OF 11

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

KETNER GAP, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 10 OF 11

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SEQUATCHIE COUNTY, TENNESSEE
FAIRMOUNT QUADRANGLE
SHEET NUMBER 11 OF 11

85°22′30″ 85°20′00″ 85°17′30″ 85°15′00″
35°15′00″ 35°12′30″ 35°10′00″ 35°07′30″

3901 000mN 3900 3899 3898 3897 3896 3895 3894 3893 3892 3891 3890 3889 000mN

649 000mE 650 651 652 653 654 655 656 657 658 659

Maizie Ridge
Frederick Creek
FRUEDENBERG
HORSESHOE RIDGE
HAMILTON COUNTY
THE RIDGE
Brimer Creek
Standifer Creek
North Chickamauga Creek
Devils Backbone
Brock
Lone Oak
HAMILTON COUNTY

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1974-1977) aerial photography. Hydrography and culture information created by NRCS. Soils data were derived from SSURGO.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 16. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3	1 DAUS 2 HENSON GAP 3 SODDY
4		5	4 KETNER GAP 5 DAISY
6	7	8	6 WAUHATCHIE 7 CHATTANOOGA 8 EAST CHATTANOOGA

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FAIRMOUNT, TENNESSEE
7.5 MINUTE SERIES
SHEET NUMBER 11 OF 11

SEQUATCHIE COUNTY, TENNESSEE NO. 11